

CRYSTALLINE LYSINE ACETYLTRANSFERASE 6A (KAT6A) INHIBITOR AND USES THEREOF**CROSS-REFERENCE**

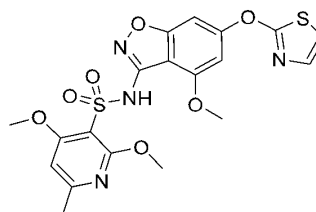
[0001] This patent application claims the benefit of International Application No. PCT/CN2023/090649, filed April 25, 2023; which is incorporated herein by reference in its entirety.

BACKGROUND

[0002] Lysine acetyltransferase 6A (KAT6A) belongs to the MYST family of acetyltransferases and was first discovered approximately 25 years ago. KAT6A controls fundamental cellular processes, including gene transcription, cellular senescence, cardiac septum development, memory T-cell diversity, and maintenance of normal hematopoietic stem cells. Dysregulation of KAT6A acetyltransferase activity or aberrant expression of KAT6A has been associated with oncogenic function in a number of cancers, including leukemia, glioma, endometrial serous carcinoma, and breast cancer. As such, compounds that inhibit KAT6A are potential agents for treating a variety of cancers, especially a stable crystalline form.

SUMMARY

[0003] Disclosed herein is a solid state form of 2,4-dimethoxy-N-(4-methoxy-6-(thiazol-2-



yl)benzo[d]isoxazol-3-yl)-6-methylpyridine-3-sulfonamide:

(Compound 1) or a pharmaceutically acceptable salt thereof.

[0004] In some embodiments, the solid state form is a crystalline form.

[0005] In some embodiments, the solid state form is crystalline Compound 1 freeform Type A, crystalline Compound 1 freeform Type C, crystalline Compound 1 freeform Type D, crystalline Compound 1 freeform Type E, or crystalline Compound 1 freeform Type F.

[0006] In some embodiments, the solid state form is crystalline Compound 1 freeform Type B.

[0007] In some embodiments, the solid state form is in the form of a salt.

[0008] In some embodiments, the solid state form is in the form of a sodium, potassium, ammonium, or choline salt.

[0009] In some embodiments, the solid state form is in the form of an L-arginine salt.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The features of the invention are set forth with particularity in the appended claims. A better understanding of the features of the present invention will be obtained by reference to the following detailed description that sets forth illustrative embodiments, in which the principles of the invention are utilized, and the accompanying drawings of which:

[0011] FIG. 1 shows the X-Ray Powder Diffraction (XRPD) pattern of amorphous Compound 1 freeform.

[0012] FIG. 2 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 freeform Type A.

[0013] FIG. 3 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 freeform Type A.

[0014] FIG. 4 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 freeform Type A.

[0015] FIG. 5 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 freeform Type B.

[0016] FIG. 6 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 freeform Type B.

[0017] FIG. 7 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 freeform Type B.

[0018] FIG. 8 shows the Dynamic Vapor Sorption (DVS) plot of Compound 1 freeform Type B.

[0019] FIG. 9 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 freeform Type C.

[0020] FIG. 10 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 freeform Type C.

[0021] FIG. 11 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 freeform Type C.

[0022] FIG. 12 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 freeform Type D.

[0023] FIG. 13 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 freeform Type D.

[0024] FIG. 14 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 freeform Type D.

[0025] FIG. 15 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 freeform Type E.

[0026] FIG. 16 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 freeform Type E.

[0027] FIG. 17 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 freeform Type E.

[0028] FIG. 18 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 freeform Type F.

[0029] FIG. 19 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 freeform Type F.

[0030] FIG. 20 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 freeform Type F.

[0031] FIG. 21 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 Sodium Salt Type A.

[0032] FIG. 22 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 Sodium Salt Type A.

[0033] FIG. 23 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 Sodium Salt Type A.

[0034] FIG. 24 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 Sodium Salt Type B.

[0035] FIG. 25 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 Sodium Salt Type C.

[0036] FIG. 26 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 Sodium Salt Type C.

[0037] FIG. 27 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 Sodium Salt Type C.

[0038] FIG. 28 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 Sodium Salt Type D.

[0039] FIG. 29 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 Sodium Salt Type D.

[0040] FIG. 30 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 Sodium Salt Type D.

[0041] FIG. 31 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 Potassium Salt Type A.

[0042] FIG. 32 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 Potassium Salt Type A.

[0043] FIG. 33 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 Potassium Salt Type A.

[0044] FIG. 34 shows the X-Ray Powder Diffraction (XRPD) pattern of Ammonium Salt Type A

[0045] FIG. 35 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 Ammonium Salt Type A.

[0046] FIG. 36 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 Ammonium Salt Type A.

[0047] FIG. 37 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 Ammonium Salt Type B.

[0048] FIG. 38 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 Ammonium Salt Type B.

[0049] FIG. 39 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 Ammonium Salt Type B.

[0050] FIG. 40 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 Ammonium Salt Type C.

[0051] FIG. 41 shows the Differential Scanning Calorimetry (DSC) thermogram of Ammonium Salt Type C.

[0052] FIG. 42 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 Ammonium Salt Type C.

[0053] FIG. 43 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 L-Arginine Salt Type A.

[0054] FIG. 44 shows the Differential Scanning Calorimetry (DSC) thermogram of L-Arginine Salt Type A.

[0055] FIG. 45 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 L-Arginine Salt Type A.

[0056] FIG. 46 shows the X-Ray Powder Diffraction (XRPD) pattern of Compound 1 Choline Salt Type A

[0057] FIG. 47 shows the Differential Scanning Calorimetry (DSC) thermogram of Compound 1 Choline Salt Type A.

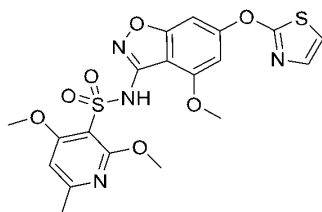
[0058] FIG. 48 shows the Thermogravimetric Analysis (TGA) thermogram of Compound 1 Choline Salt Type A.

DETAILED DESCRIPTION

[0059] While small molecule inhibitors are often initially evaluated for their activity when dissolved in solution, solid state characteristics such as polymorphism are also important. Polymorphic forms of a drug substance can have different physical properties, including melting point, apparent solubility, dissolution rate, optical and mechanical properties, vapor pressure, and density. These properties can have a direct effect on the ability to process or manufacture a drug substance and the drug product. Moreover, differences in these properties can and often lead to different pharmacokinetics profiles for different polymorphic forms of a drug. Therefore, polymorphism is often an important factor under regulatory review of the ‘sameness’ of drug products from various manufacturers.

Compound 1

[0060] Compound 1 is 2,4-dimethoxy-N-(4-methoxy-6-(thiazol-2-yloxy)benzo[d]isoxazol-3-yl)-6-



methylpyridine-3-sulfonamide:

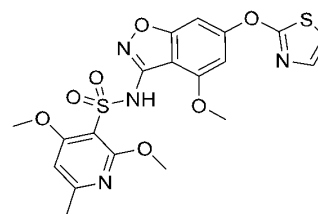
(Compound 1). In some embodiments,

Compound 1 is in the form of a freeform. In some embodiments, Compound 1 is in the form of a pharmaceutically acceptable salt. In some embodiments, Compound 1 is in the form of a sodium salt. In some embodiments, Compound 1 is in the form of a potassium salt. In some embodiments, Compound 1 is in the form of an ammonium salt. In some embodiments, Compound 1 is in the form of a choline salt. In some embodiments, Compound 1 is in the form of an L-arginine salt. In some embodiments, Compound 1 is in the form of a co-crystal. In some embodiments, Compound 1 is in an amorphous form.

In some embodiments, Compound 1 is in a non-ionized form. In some embodiments, a freeform of Compound 1 is in a non-ionized form.

Solid State Form of Compound 1

[0061] In one aspect, provided herein is a solid state form of 2,4-dimethoxy-N-(4-methoxy-6-(thiazol-



2-yloxy)benzo[d]isoxazol-3-yl)-6-methylpyridine-3-sulfonamide:

(Compound 1) or a pharmaceutically acceptable salt thereof.

[0062] In some embodiments, the solid state form is a crystalline form.

[0063] In some embodiments, the solid state form is crystalline Compound 1 freeform. In some embodiments, the solid state form is crystalline Compound 1 freeform Type A, crystalline Compound 1 freeform Type B, or crystalline Compound 1 freeform Type D. In some embodiments, the solid state form is crystalline Compound 1 freeform Type A. In some embodiments, the solid state form is crystalline Compound 1 freeform Type B. In some embodiments, the solid state form is crystalline Compound 1 freeform Type C. In some embodiments, the solid state form is crystalline Compound 1 freeform Type D. In some embodiments, the solid state form is crystalline Compound 1 freeform Type E. In some embodiments, the solid state form is crystalline Compound 1 freeform Type F.

[0064] In some embodiments, the solid state form is crystalline Compound 1 freeform Type A, Compound 1 freeform Type C, Compound 1 freeform Type D, Compound 1 freeform Type E, or Compound 1 freeform Type F.

[0065] For avoidance of doubt the term “crystalline form” is used throughout the description to include any crystalline forms including any one of the following forms: the freeform (Type A, B, C, D, E, or F), the sodium salt (Type A, B, C, or D), the potassium salt (Type A), the ammonium salt (Type A, B, or C), the L-arginine salt (Type A), and the choline salt (Type A).

Compound 1 Freeform Type A

[0066] Disclosed herein is Compound 1 freeform Type A. In some embodiments, the crystalline form is Compound 1 freeform Type A characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 2** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $8.0 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, and $21.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 3**; or

(d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 4**;

(e) combinations thereof.

[0067] In some embodiments of Compound 1 freeform Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 2** as measured using Cu K α radiation.

[0068] In some embodiments of Compound 1 freeform Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 1 as measured using Cu K α radiation.

[0069] In some embodiments of Compound 1 freeform Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $8.0 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, and $21.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0070] In some embodiments of Compound 1 freeform Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $6.9 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, and $18.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0071] In some embodiments of Compound 1 freeform Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $21.9 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $25.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0072] In some embodiments of Compound 1 freeform Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.5 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $25.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0073] In some embodiments of Compound 1 freeform Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.5 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $25.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0074] In some embodiments of Compound 1 freeform Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.5 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $25.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0075] In some embodiments of Compound 1 freeform Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.5 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $25.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0076] In some embodiments of Compound 1 freeform Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.5 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $25.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0077] In some embodiments of Compound 1 freeform Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.5 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $25.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0078] In some embodiments of Compound 1 freeform Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.5 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $25.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0079] In some embodiments of Compound 1 freeform Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.5 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $25.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0080] In some embodiments of Compound 1 freeform Type A, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 3**.

[0081] In some embodiments of Compound 1 freeform Type A, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 4**.

Table 1: XRPD peaks table of Compound 1 Freeform Type A

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	6.8954	66.88
2	8.0460	100.00
3	8.3406	18.88
4	10.7902	53.45
5	11.2696	67.27
6	12.0293	5.31
7	12.8663	33.71
8	13.1821	11.54
9	13.7114	20.12
10	14.2329	5.50
11	14.7145	2.44
12	15.8825	7.41
13	16.0597	5.62
14	16.6330	5.69
15	17.1479	2.88
16	17.5178	5.76
17	17.7579	7.56
18	18.5438	28.83
19	20.1798	7.89
20	20.5782	13.76
21	21.0129	54.81
22	21.5782	7.27
23	21.9085	31.37
24	22.1547	5.82
25	22.5588	25.23
26	23.5764	15.69
27	24.1066	14.81

Peak#	Pos. [°2 θ]	Rel. Int. [%]
28	24.4541	8.83
29	25.0229	18.07
30	25.4321	31.31
31	25.8009	8.25
32	26.1432	31.32
33	26.4741	7.50
34	27.0383	24.43
35	27.5433	10.53
36	28.0857	3.07
37	28.8299	3.23
38	29.1666	2.39
39	29.7341	4.85
40	30.1076	8.16
41	30.7204	3.30
42	31.5412	4.04
43	31.8427	9.55
44	32.3989	4.53
45	33.6131	2.30
46	34.6938	3.19
47	35.5977	3.17
48	36.1751	5.08
49	38.4416	1.72
50	39.1775	1.11

Compound 1 Freeform Type B

[0082] Disclosed herein is Compound 1 freeform Type B. In some embodiments, the crystalline form is Compound 1 freeform Type B characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 5** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $12.8 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, and $24.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 6**;
- (d) a Differential Scanning Calorimetry (DSC) thermogram with an endothermic peak having a peak temperature at about 173.1°C ;
- (e) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 7**;
- (f) a Thermogravimetric Thermal Analysis (TGA) thermogram exhibiting a mass loss of about 1.29% from the onset of heating up to approximately 150°C ; or
- (g) combinations thereof.

[0083] In some embodiments, the crystalline form is Compound 1 freeform Type B characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern with peaks at $12.8 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, and $24.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;

- (b) a Differential Scanning Calorimetry (DSC) thermogram with an endothermic peak having a peak temperature at about 173.1 °C;
- (c) a Thermogravimetric Thermal Analysis (TGA) thermogram exhibiting a mass loss of about 1.29% from the onset of heating up to approximately 150 °C; or
- (d) combinations thereof.

[0084] In some embodiments, the crystalline form is Compound 1 freeform Type B characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 5** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $12.8 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, and $24.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 6**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 7**; or
- (e) combinations thereof.

[0085] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 5** as measured using Cu K α radiation.

[0086] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 2 as measured using Cu K α radiation.

[0087] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $12.8 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, and $24.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0088] In some embodiments of Compound 1 freeform Type B, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $12.0 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, and $22.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0089] In some embodiments of Compound 1 freeform Type B, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $5.4 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0090] In some embodiments of Compound 1 freeform Type B, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $22.1 \pm 0.2^\circ 2\theta$ and $25.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0091] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $5.4 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $12.8 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, $24.7 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0092] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$,

$12.8 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, $24.7 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0093] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $12.8 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, $24.7 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0094] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $12.8 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, $24.7 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0095] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $12.8 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, $24.7 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0096] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $12.8 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, $24.7 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0097] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $12.8 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, $24.7 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0098] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $12.8 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, $24.7 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[0099] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least nine peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $12.8 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, $24.7 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00100] In some embodiments of Compound 1 freeform Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least 10 peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $12.8 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, $24.7 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00101] In some embodiments of Compound 1 freeform Type B, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 6**.

[00102] In some embodiments of Compound 1 freeform Type B, the Differential Scanning Calorimetry (DSC) thermogram has an endothermic peak having a peak temperature at about 173.1°C .

[00103] In some embodiments of Compound 1 freeform Type B, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 7**.

[00104] In some embodiments of Compound 1 freeform Type B, the Thermogravimetric Thermal Analysis (TGA) thermogram exhibits a mass loss of about 1.29% from the onset of heating up to approximately 150 °C. In some embodiments of Compound 1 freeform Type B, the Thermogravimetric Thermal Analysis (TGA) thermogram exhibits a mass loss of less than 1.5% from the onset of heating up to approximately 150 °C. In some embodiments of Compound 1 freeform Type B, the Thermogravimetric Thermal Analysis (TGA) thermogram exhibits a mass loss of less than 2% from the onset of heating up to approximately 150 °C.

[00105] In some embodiments of Compound 1 freeform Type B, the crystalline form is non hygroscopic.

[00106] In some embodiments of Compound 1 freeform Type B, the crystalline form is an anhydrate.

[00107] In some embodiments of Compound 1 freeform Type B, 0.0679% water uptake was detected at 80% relative humidity (RH)/25 °C in the sorption curve from 0%RH to 95%RH. In some embodiments of Compound 1 freeform Type B, less than 0.1%, less than 0.2%, less than 0.5%, less than 0.8%, less than 1%, or less than 2% water uptake is detected at 80% relative humidity (RH)/25 °C in the sorption curve from 0%RH to 95%RH. In some embodiments of Compound 1 freeform Type B, less than 0.1% water uptake is detected at 80% relative humidity (RH)/25 °C in the sorption curve from 0%RH to 95%RH.

Table 2: XRPD peaks table of Compound 1 Freeform Type B

Peak#	Pos. [°2θ]	Rel. Int. [%]
1	5.3731	23.63
2	9.0669	3.28
3	12.0327	72.22
4	12.7912	100.00
5	13.7256	8.59
6	14.4651	27.87
7	14.6229	18.77
8	16.6906	7.13
9	17.5213	7.62
10	18.3450	8.76
11	20.5485	5.76
12	21.5640	48.50
13	22.0533	12.32
14	22.7102	38.61
15	23.0218	23.55
16	23.5262	9.56
17	23.8094	8.75
18	24.2514	8.13
19	24.6647	74.07
20	25.1125	14.56
21	25.7484	8.94
22	27.0124	26.30
23	27.5053	8.54

Peak#	Pos. [°2 θ]	Rel. Int. [%]
24	28.1100	11.37
25	29.9347	5.06
26	30.9704	4.43
27	32.7572	2.21

Compound 1 Freeform Type C

[00108] Disclosed herein is Compound 1 freeform Type C. In some embodiments, the crystalline form is Compound 1 freeform Type C characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 9** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $11.3 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, and $20.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 10**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 11**; or
- (e) combinations thereof.

[00109] In some embodiments of Compound 1 freeform Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 9** as measured using Cu K α radiation.

[00110] In some embodiments of Compound 1 freeform Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 3 as measured using Cu K α radiation.

[00111] In some embodiments of Compound 1 freeform Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $11.3 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, and $20.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00112] In some embodiments of Compound 1 freeform Type C, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $15.4 \pm 0.2^\circ 2\theta$, $20.3 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00113] In some embodiments of Compound 1 freeform Type C, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $7.7 \pm 0.2^\circ 2\theta$ and $23.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00114] In some embodiments of Compound 1 freeform Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $7.7 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.3 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $23.4 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00115] In some embodiments of Compound 1 freeform Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $7.7 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.3 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $23.4 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00116] In some embodiments of Compound 1 freeform Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $7.7 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.3 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $23.4 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00117] In some embodiments of Compound 1 freeform Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $7.7 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.3 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $23.4 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00118] In some embodiments of Compound 1 freeform Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $7.7 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.3 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $23.4 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00119] In some embodiments of Compound 1 freeform Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $7.7 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.3 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $23.4 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00120] In some embodiments of Compound 1 freeform Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $7.7 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.3 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $23.4 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00121] In some embodiments of Compound 1 freeform Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $7.7 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.3 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $23.4 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00122] In some embodiments of Compound 1 freeform Type C, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 10**.

[00123] In some embodiments of Compound 1 freeform Type C, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 11**.

Table 3: XRPD peaks table of Compound 1 Freeform Type C

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	7.6961	21.18
2	8.0886	16.23
3	11.2969	69.65
4	11.7987	33.12
5	13.6792	3.19
6	14.5520	14.74
7	15.3737	69.10
8	16.5256	41.35
9	16.7426	12.91
10	18.9311	5.87

Peak#	Pos. [°2 θ]	Rel. Int. [%]
11	19.9016	23.31
12	20.3167	89.73
13	20.8751	100.00
14	21.6584	75.72
15	21.9705	14.80
16	22.7931	16.28
17	23.3850	33.69
18	24.3345	11.60
19	24.5800	16.37
20	25.2441	5.09
21	26.3840	13.99
22	26.9351	73.15
23	27.9368	25.85
24	28.3302	32.34
25	29.0047	6.40
26	30.1935	6.99
27	31.7170	2.33
28	32.5185	3.79
29	34.3671	12.88
30	34.9952	3.94
31	35.9712	8.28
32	37.7351	2.25
33	38.4215	2.20

Compound 1 Freeform Type D

[00124] Disclosed herein is Compound 1 freeform Type D. In some embodiments, the crystalline form is Compound 1 freeform Type D characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 12** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $7.5 \pm 0.2^\circ 2\theta$, $15.1 \pm 0.2^\circ 2\theta$, and $20.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 13**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 14**; or
- (e) combinations thereof.

[00125] In some embodiments of Compound 1 freeform Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 12** as measured using Cu K α radiation.

[00126] In some embodiments of Compound 1 freeform Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 4 as measured using Cu K α radiation.

[00127] In some embodiments of Compound 1 freeform Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $7.5 \pm 0.2^\circ 2\theta$, $15.1 \pm 0.2^\circ 2\theta$, and $20.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00128] In some embodiments of Compound 1 freeform Type D, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $11.3 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, and $21.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00129] In some embodiments of Compound 1 freeform Type D, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $23.3 \pm 0.2^\circ 2\theta$ and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00130] In some embodiments of Compound 1 freeform Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $7.5 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.1 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $23.3 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00131] In some embodiments of Compound 1 freeform Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $7.5 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.1 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $23.3 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00132] In some embodiments of Compound 1 freeform Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $7.5 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.1 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $23.3 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00133] In some embodiments of Compound 1 freeform Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $7.5 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.1 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $23.3 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00134] In some embodiments of Compound 1 freeform Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $7.5 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.1 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $23.3 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00135] In some embodiments of Compound 1 freeform Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $7.5 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.1 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $23.3 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00136] In some embodiments of Compound 1 freeform Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $7.5 \pm 0.2^\circ 2\theta$, $11.3 \pm 0.2^\circ 2\theta$, $15.1 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $23.3 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00137] In some embodiments of Compound 1 freeform Type D, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 13**.

[00138] In some embodiments of Compound 1 freeform Type D, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 14**.

Table 4: XRPD peaks table of Compound 1 Freeform Type D

Peak#	Pos. [$^{\circ}2\theta$]	Rel. Int. [%]
1	7.5394	52.45
2	8.0336	31.03
3	11.2540	89.93
4	11.8122	37.29
5	12.8650	8.93
6	14.5692	17.11
7	15.0533	63.10
8	16.4738	36.12
9	18.3969	4.02
10	19.9363	60.70
11	20.5027	100.00
12	21.4807	69.11
13	21.9514	18.35
14	22.5345	16.07
15	23.3182	37.59
16	24.1837	16.74
17	24.6249	10.38
18	26.4889	49.99
19	27.5647	22.25
20	27.8238	25.06
21	29.7215	6.84
22	32.3121	2.62
23	33.8691	6.61

Compound 1 Freeform Type E

[00139] Disclosed herein is Compound 1 freeform Type E. In some embodiments, the crystalline form is Compound 1 freeform Type E characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 15** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $11.5 \pm 0.2^{\circ} 2\theta$, $17.9 \pm 0.2^{\circ} 2\theta$, and $20.7 \pm 0.2^{\circ} 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 16**;
- (d) a Differential Scanning Calorimetry (DSC) thermogram with an endothermic peak having a peak temperature at about 101.0°C ;
- (e) a Differential Scanning Calorimetry (DSC) thermogram with an endothermic peak having a peak temperature at about 109.6°C ;
- (f) a Differential Scanning Calorimetry (DSC) thermogram with an exotherm peak having a peak temperature at about 173.4°C ;
- (g) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 17**;
- (h) a Thermogravimetric Thermal Analysis (TGA) thermogram exhibiting a mass loss of about 16.63 % from the onset of heating up to approximately 150°C ; or

- (i) combinations thereof.

[00140] In some embodiments, the crystalline form is Compound 1 freeform Type E characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern with peaks at $11.5 \pm 0.2^\circ 2\theta$, $17.9 \pm 0.2^\circ 2\theta$, and $20.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (b) a Differential Scanning Calorimetry (DSC) thermogram with an endothermic peak having a peak temperature at about 101.0 °C;
- (c) a Differential Scanning Calorimetry (DSC) thermogram with an endothermic peak having a peak temperature at about 109.6 °C;
- (d) a Differential Scanning Calorimetry (DSC) thermogram with an exotherm peak having a peak temperature at about 173.4 °C;
- (e) a Thermogravimetric Thermal Analysis (TGA) thermogram exhibiting a mass loss of about 16.63 % from the onset of heating up to approximately 150 °C; or
- (f) combinations thereof.

[00141] In some embodiments, the crystalline form is Compound 1 freeform Type E characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 15** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $11.5 \pm 0.2^\circ 2\theta$, $17.9 \pm 0.2^\circ 2\theta$, and $20.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 16**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 17**; or
- (e) combinations thereof.

[00142] In some embodiments of Compound 1 freeform Type E, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 15** as measured using Cu K α radiation.

[00143] In some embodiments of Compound 1 freeform Type E, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 5 as measured using Cu K α radiation.

[00144] In some embodiments of Compound 1 freeform Type E, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $11.5 \pm 0.2^\circ 2\theta$, $17.9 \pm 0.2^\circ 2\theta$, and $20.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00145] In some embodiments of Compound 1 freeform Type E, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $6.5 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, and $21.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00146] In some embodiments of Compound 1 freeform Type E, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $19.8 \pm 0.2^\circ 2\theta$, $23.8 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00147] In some embodiments of Compound 1 freeform Type E, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.5 \pm 0.2^\circ 2\theta$, $11.5 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $17.9 \pm 0.2^\circ 2\theta$, $19.8 \pm 0.2^\circ 2\theta$, $20.7 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $23.8 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00148] In some embodiments of Compound 1 freeform Type E, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $11.5 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $17.9 \pm 0.2^\circ 2\theta$, $19.8 \pm 0.2^\circ 2\theta$, $20.7 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $23.8 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00149] In some embodiments of Compound 1 freeform Type E, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $11.5 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $17.9 \pm 0.2^\circ 2\theta$, $19.8 \pm 0.2^\circ 2\theta$, $20.7 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $23.8 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00150] In some embodiments of Compound 1 freeform Type E, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $11.5 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $17.9 \pm 0.2^\circ 2\theta$, $19.8 \pm 0.2^\circ 2\theta$, $20.7 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $23.8 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00151] In some embodiments of Compound 1 freeform Type E, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $11.5 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $17.9 \pm 0.2^\circ 2\theta$, $19.8 \pm 0.2^\circ 2\theta$, $20.7 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $23.8 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00152] In some embodiments of Compound 1 freeform Type E, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $11.5 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $17.9 \pm 0.2^\circ 2\theta$, $19.8 \pm 0.2^\circ 2\theta$, $20.7 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $23.8 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00153] In some embodiments of Compound 1 freeform Type E, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $11.5 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $17.9 \pm 0.2^\circ 2\theta$, $19.8 \pm 0.2^\circ 2\theta$, $20.7 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $23.8 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00154] In some embodiments of Compound 1 freeform Type E, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $11.5 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $17.9 \pm 0.2^\circ 2\theta$, $19.8 \pm 0.2^\circ 2\theta$, $20.7 \pm 0.2^\circ 2\theta$, $21.9 \pm 0.2^\circ 2\theta$, $23.8 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00155] In some embodiments of Compound 1 freeform Type E, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 16**.

[00156] In some embodiments of Compound 1 freeform Type E, the Differential Scanning Calorimetry (DSC) thermogram has an endothermic peak having a peak temperature at about 101.0 °C.

[00157] In some embodiments of Compound 1 freeform Type E, the Differential Scanning Calorimetry (DSC) thermogram has an endothermic peak having a peak temperature at about 109.6 °C.

[00158] In some embodiments of Compound 1 freeform Type E, the Differential Scanning Calorimetry (DSC) thermogram has an exotherm peak having a peak temperature at about 173.4 °C.

[00159] In some embodiments of Compound 1 freeform Type E, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 17**.

[00160] In some embodiments of Compound 1 freeform Type E, the Thermogravimetric Thermal Analysis (TGA) thermogram exhibits a mass loss of about 16.63 % from the onset of heating up to approximately 150 °C.

Table 5: XRPD peaks table of Compound 1 Freeform Type E

Peak#	Pos. [°2θ]	Rel. Int. [%]
1	6.4571	73.71
2	8.0487	1.75
3	9.8363	13.37
4	11.4994	76.32
5	12.8606	97.30
6	14.8698	13.99
7	15.3610	11.22
8	16.1883	1.87
9	16.9516	12.09
10	17.1448	5.01
11	17.7235	30.87
12	17.8676	34.40
13	18.4247	8.31
14	19.3086	10.35
15	19.5212	16.54
16	19.7915	22.57
17	20.7093	100.00
18	21.9371	36.74
19	22.0676	36.43
20	22.4370	10.78
21	22.9789	6.79
22	23.7679	25.69
23	24.4104	21.32
24	24.6879	10.24
25	25.3706	9.81
26	25.6091	6.45
27	26.5450	27.33
28	26.8988	18.69
29	27.2036	11.68
30	28.6679	12.35
31	29.4849	4.08
32	29.8996	9.83
33	30.0708	11.49
34	31.9078	1.59
35	33.1844	1.72

Peak#	Pos. [2θ]	Rel. Int. [%]
36	34.1196	2.94
37	36.1448	5.42
38	36.5599	7.08

Compound 1 Freeform Type F

[00161] Disclosed herein is Compound 1 freeform Type F. In some embodiments, the crystalline form is Compound 1 freeform Type F characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 18** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $8.0 \pm 0.2^\circ 2\theta$, $18.3 \pm 0.2^\circ 2\theta$, and $25.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 19**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 20**; or
- (e) combinations thereof.

[00162] In some embodiments of Compound 1 freeform Type F, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 18** as measured using Cu K α radiation.

[00163] In some embodiments of Compound 1 freeform Type F, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 6 as measured using Cu K α radiation.

[00164] In some embodiments of Compound 1 freeform Type F, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $8.0 \pm 0.2^\circ 2\theta$, $18.3 \pm 0.2^\circ 2\theta$, and $25.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00165] In some embodiments of Compound 1 freeform Type F, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $11.2 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, and $25.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00166] In some embodiments of Compound 1 freeform Type F, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $6.9 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, and $22.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00167] In some embodiments of Compound 1 freeform Type F, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.2 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.3 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $22.5 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $25.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00168] In some embodiments of Compound 1 freeform Type F, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.2 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.3 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $22.5 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $25.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00169] In some embodiments of Compound 1 freeform Type F, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.2 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.3 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $22.5 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $25.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00170] In some embodiments of Compound 1 freeform Type F, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.2 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.3 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $22.5 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $25.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00171] In some embodiments of Compound 1 freeform Type F, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.2 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.3 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $22.5 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $25.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00172] In some embodiments of Compound 1 freeform Type F, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.2 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.3 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $22.5 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $25.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00173] In some embodiments of Compound 1 freeform Type F, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.2 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.3 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $22.5 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $25.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00174] In some embodiments of Compound 1 freeform Type F, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $6.9 \pm 0.2^\circ 2\theta$, $8.0 \pm 0.2^\circ 2\theta$, $11.2 \pm 0.2^\circ 2\theta$, $12.9 \pm 0.2^\circ 2\theta$, $18.3 \pm 0.2^\circ 2\theta$, $21.0 \pm 0.2^\circ 2\theta$, $22.5 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $25.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00175] In some embodiments of Compound 1 freeform Type F, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 19**.

[00176] In some embodiments of Compound 1 freeform Type F, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 20**.

Table 6: XRPD peaks table of Compound 1 Freeform Type F

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	6.8525	32.95
2	7.9619	100.00
3	10.6135	55.45
4	11.1849	99.92
5	12.8566	38.94
6	13.1233	16.79
7	13.7049	24.28
8	13.9533	17.60
9	14.5697	4.59
10	15.8310	18.05

Peak#	Pos. [°2 θ]	Rel. Int. [%]
11	17.1809	12.61
12	17.5217	11.78
13	18.3455	50.43
14	19.7841	11.86
15	20.6429	28.37
16	21.0151	72.86
17	21.6635	34.18
18	22.4612	40.33
19	23.0669	12.21
20	23.4875	7.01
21	24.1260	31.01
22	24.4284	16.45
23	25.0991	87.94
24	25.8139	64.92
25	26.7424	31.69
26	27.6082	12.11
27	28.7713	6.74
28	29.4764	13.69
29	31.1543	7.30
30	31.7525	14.70
31	32.5945	3.57
32	33.1396	3.77
33	34.6677	4.29
34	35.9967	7.03
35	36.4848	5.48
36	36.9538	5.65

Compound 1 Sodium Salt Type A

[00177] Disclosed herein is Compound 1 sodium salt Type A. In some embodiments, the crystalline form is Compound 1 sodium salt Type A characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 21** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $9.2 \pm 0.2^\circ 2\theta$, $17.8 \pm 0.2^\circ 2\theta$, and $24.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 22**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 23**; or
- (e) combinations thereof.

[00178] In some embodiments of Compound 1 sodium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 21** as measured using Cu K α radiation.

[00179] In some embodiments of Compound 1 sodium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 7 as measured using Cu K α radiation.

[00180] In some embodiments of Compound 1 sodium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $9.2 \pm 0.2^\circ 2\theta$, $17.8 \pm 0.2^\circ 2\theta$, and $24.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00181] In some embodiments of Compound 1 sodium salt Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $11.1 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, and $25.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00182] In some embodiments of Compound 1 sodium salt Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $20.6 \pm 0.2^\circ 2\theta$, $25.2 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00183] In some embodiments of Compound 1 sodium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $9.2 \pm 0.2^\circ 2\theta$, $11.1 \pm 0.2^\circ 2\theta$, $17.8 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $24.6 \pm 0.2^\circ 2\theta$, $25.2 \pm 0.2^\circ 2\theta$, $25.9 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00184] In some embodiments of Compound 1 sodium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $9.2 \pm 0.2^\circ 2\theta$, $11.1 \pm 0.2^\circ 2\theta$, $17.8 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $24.6 \pm 0.2^\circ 2\theta$, $25.2 \pm 0.2^\circ 2\theta$, $25.9 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00185] In some embodiments of Compound 1 sodium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $9.2 \pm 0.2^\circ 2\theta$, $11.1 \pm 0.2^\circ 2\theta$, $17.8 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $24.6 \pm 0.2^\circ 2\theta$, $25.2 \pm 0.2^\circ 2\theta$, $25.9 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00186] In some embodiments of Compound 1 sodium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $9.2 \pm 0.2^\circ 2\theta$, $11.1 \pm 0.2^\circ 2\theta$, $17.8 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $24.6 \pm 0.2^\circ 2\theta$, $25.2 \pm 0.2^\circ 2\theta$, $25.9 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00187] In some embodiments of Compound 1 sodium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $9.2 \pm 0.2^\circ 2\theta$, $11.1 \pm 0.2^\circ 2\theta$, $17.8 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $24.6 \pm 0.2^\circ 2\theta$, $25.2 \pm 0.2^\circ 2\theta$, $25.9 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00188] In some embodiments of Compound 1 sodium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $9.2 \pm 0.2^\circ 2\theta$, $11.1 \pm 0.2^\circ 2\theta$, $17.8 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $24.6 \pm 0.2^\circ 2\theta$, $25.2 \pm 0.2^\circ 2\theta$, $25.9 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00189] In some embodiments of Compound 1 sodium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $9.2 \pm 0.2^\circ 2\theta$, $11.1 \pm 0.2^\circ 2\theta$, $17.8 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $24.6 \pm 0.2^\circ 2\theta$, $25.2 \pm 0.2^\circ 2\theta$, $25.9 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00190] In some embodiments of Compound 1 sodium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $9.2 \pm 0.2^\circ 2\theta$, $11.1 \pm 0.2^\circ 2\theta$, $17.8 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $24.6 \pm 0.2^\circ 2\theta$, $25.2 \pm 0.2^\circ 2\theta$, $25.9 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00191] In some embodiments of Compound 1 sodium salt Type A, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 22**.

[00192] In some embodiments of Compound 1 sodium salt Type A, wherein the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 23**.

Table 7: XRPD peaks table of Compound 1 Sodium Salt Type A

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	9.1625	100.00
2	11.0674	42.97
3	13.2542	11.61
4	13.9347	8.45
5	14.6030	10.10
6	14.9038	7.54
7	15.4629	4.76
8	16.8004	7.59
9	17.8002	26.40
10	18.3859	5.22
11	18.9204	6.21
12	19.8453	5.90
13	20.6340	12.19
14	21.3474	13.87
15	21.7729	24.68
16	23.7058	8.84
17	24.5574	24.80
18	25.2447	17.52
19	25.9241	18.96
20	26.8964	17.10
21	27.6778	5.08
22	29.0890	4.43
23	31.2883	2.39
24	32.2150	2.30
25	33.4718	2.75
26	35.9630	4.30
27	38.3239	1.14

Compound 1 Sodium Salt Type B

[00193] Disclosed herein is Compound 1 sodium salt Type B. In some embodiments, the crystalline form is Compound 1 sodium salt Type B characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 24** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $8.7 \pm 0.2^\circ 2\theta$, $17.4 \pm 0.2^\circ 2\theta$, and $22.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation; or
- (c) combinations thereof.

[00194] In some embodiments of Compound 1 sodium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 24** as measured using Cu K α radiation.

[00195] In some embodiments of Compound 1 sodium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 8 as measured using Cu K α radiation.

[00196] In some embodiments of Compound 1 sodium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $8.7 \pm 0.2^\circ 2\theta$, $17.4 \pm 0.2^\circ 2\theta$, and $22.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00197] In some embodiments of Compound 1 sodium salt Type B, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $5.3 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, and $21.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00198] In some embodiments of Compound 1 sodium salt Type B, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $14.5 \pm 0.2^\circ 2\theta$ and $24.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00199] In some embodiments of Compound 1 sodium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $5.3 \pm 0.2^\circ 2\theta$, $8.7 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $17.4 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, and $24.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00200] In some embodiments of Compound 1 sodium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $8.7 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $17.4 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, and $24.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00201] In some embodiments of Compound 1 sodium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $8.7 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $17.4 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, and $24.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00202] In some embodiments of Compound 1 sodium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $8.7 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $17.4 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, and $24.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00203] In some embodiments of Compound 1 sodium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $8.7 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $17.4 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, and $24.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00204] In some embodiments of Compound 1 sodium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $8.7 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $17.4 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, and $24.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00205] In some embodiments of Compound 1 sodium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $8.7 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $17.4 \pm 0.2^\circ 2\theta$, $21.5 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, and $24.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

Table 8: XRPD peaks table of Compound 1 Sodium Salt Type B

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	5.2606	71.74
2	8.7104	100.00
3	9.3634	97.83
4	11.3638	45.20
5	12.0122	89.11
6	12.7706	17.80
7	14.4500	29.04
8	16.4087	15.24
9	17.4276	50.09
10	18.9087	12.47
11	21.5338	36.96
12	22.6917	40.08
13	23.5149	9.80
14	24.6484	22.32
15	25.1029	10.13
16	26.4731	10.37
17	28.3190	9.17
18	34.1311	6.57

Compound 1 Sodium Salt Type C

[00206] Disclosed herein is Compound 1 sodium salt Type C. In some embodiments, the crystalline form is Compound 1 sodium salt Type C characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 25** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $8.2 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 26**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 27**; or
- (e) combinations thereof.

[00207] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 25** as measured using Cu K α radiation.

[00208] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 9 as measured using Cu K α radiation.

[00209] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $8.2 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00210] In some embodiments of Compound 1 sodium salt Type C, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $10.5 \pm 0.2^\circ 2\theta$, $17.5 \pm 0.2^\circ 2\theta$, and $24.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00211] In some embodiments of Compound 1 sodium salt Type C, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $5.4 \pm 0.2^\circ 2\theta$, $26.6 \pm 0.2^\circ 2\theta$, $30.2 \pm 0.2^\circ 2\theta$, and $31.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00212] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $5.4 \pm 0.2^\circ 2\theta$, $8.2 \pm 0.2^\circ 2\theta$, $10.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $17.5 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $24.8 \pm 0.2^\circ 2\theta$, $26.6 \pm 0.2^\circ 2\theta$, $30.2 \pm 0.2^\circ 2\theta$, and $31.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00213] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $8.2 \pm 0.2^\circ 2\theta$, $10.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $17.5 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $24.8 \pm 0.2^\circ 2\theta$, $26.6 \pm 0.2^\circ 2\theta$, $30.2 \pm 0.2^\circ 2\theta$, and $31.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00214] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $8.2 \pm 0.2^\circ 2\theta$, $10.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $17.5 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $24.8 \pm 0.2^\circ 2\theta$, $26.6 \pm 0.2^\circ 2\theta$, $30.2 \pm 0.2^\circ 2\theta$, and $31.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00215] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $8.2 \pm 0.2^\circ 2\theta$, $10.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $17.5 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $24.8 \pm 0.2^\circ 2\theta$, $26.6 \pm 0.2^\circ 2\theta$, $30.2 \pm 0.2^\circ 2\theta$, and $31.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00216] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $8.2 \pm 0.2^\circ 2\theta$, $10.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $17.5 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $24.8 \pm 0.2^\circ 2\theta$, $26.6 \pm 0.2^\circ 2\theta$, $30.2 \pm 0.2^\circ 2\theta$, and $31.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00217] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $8.2 \pm 0.2^\circ 2\theta$, $10.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $17.5 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $24.8 \pm 0.2^\circ 2\theta$, $26.6 \pm 0.2^\circ 2\theta$, $30.2 \pm 0.2^\circ 2\theta$, and $31.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00218] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $8.2 \pm 0.2^\circ 2\theta$, $10.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $17.5 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $24.8 \pm 0.2^\circ 2\theta$, $26.6 \pm 0.2^\circ 2\theta$, $30.2 \pm 0.2^\circ 2\theta$, and $31.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00219] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $8.2 \pm 0.2^\circ 2\theta$, $10.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $17.5 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $24.8 \pm 0.2^\circ 2\theta$, $26.6 \pm 0.2^\circ 2\theta$, $30.2 \pm 0.2^\circ 2\theta$, and $31.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00220] In some embodiments of Compound 1 sodium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least nine peaks selected from $5.4 \pm 0.2^\circ 2\theta$, $8.2 \pm 0.2^\circ 2\theta$, $10.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $17.5 \pm 0.2^\circ 2\theta$, $21.7 \pm 0.2^\circ 2\theta$, $24.8 \pm 0.2^\circ 2\theta$, $26.6 \pm 0.2^\circ 2\theta$, $30.2 \pm 0.2^\circ 2\theta$, and $31.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00221] In some embodiments of Compound 1 sodium salt Type C, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 26**.

[00222] In some embodiments of Compound 1 sodium salt Type C, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 27**.

Table 9: XRPD peaks table of Compound 1 Sodium Salt Type C

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	5.3844	23.45
2	7.7203	62.88
3	8.2085	100.00
4	8.8361	51.07
5	10.5232	79.74
6	11.4615	47.37
7	15.4421	77.22
8	16.5761	14.89
9	17.4559	34.15
10	19.7366	13.14
11	21.6906	44.16
12	23.1435	24.70
13	23.6074	22.51
14	24.8408	79.55
15	25.1047	72.42
16	26.6434	23.92
17	27.2001	20.91
18	30.1795	45.47
19	31.1389	29.39
20	38.3737	4.34

Compound 1 Sodium Salt Type D

[00223] Disclosed herein is Compound 1 sodium salt Type D. In some embodiments, the crystalline form is Compound 1 sodium salt Type D characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 28** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $9.3 \pm 0.2^\circ 2\theta$, $19.1 \pm 0.2^\circ 2\theta$, and $22.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;

- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 29**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 30**; or
- (e) combinations thereof.

[00224] In some embodiments of Compound 1 sodium salt Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 28** as measured using Cu K α radiation.

[00225] In some embodiments of Compound 1 sodium salt Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 10 as measured using Cu K α radiation.

[00226] In some embodiments of Compound 1 sodium salt Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $9.3 \pm 0.2^\circ 2\theta$, $19.1 \pm 0.2^\circ 2\theta$, and $22.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00227] In some embodiments of Compound 1 sodium salt Type D, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $5.3 \pm 0.2^\circ 2\theta$, $16.0 \pm 0.2^\circ 2\theta$, and $21.3 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00228] In some embodiments of Compound 1 sodium salt Type D, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $13.0 \pm 0.2^\circ 2\theta$, $14.8 \pm 0.2^\circ 2\theta$, and $26.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00229] In some embodiments of Compound 1 sodium salt Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $5.3 \pm 0.2^\circ 2\theta$, $9.3 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.8 \pm 0.2^\circ 2\theta$, $16.0 \pm 0.2^\circ 2\theta$, $19.1 \pm 0.2^\circ 2\theta$, $21.3 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $26.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00230] In some embodiments of Compound 1 sodium salt Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $9.3 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.8 \pm 0.2^\circ 2\theta$, $16.0 \pm 0.2^\circ 2\theta$, $19.1 \pm 0.2^\circ 2\theta$, $21.3 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $26.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00231] In some embodiments of Compound 1 sodium salt Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $9.3 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.8 \pm 0.2^\circ 2\theta$, $16.0 \pm 0.2^\circ 2\theta$, $19.1 \pm 0.2^\circ 2\theta$, $21.3 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $26.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00232] In some embodiments of Compound 1 sodium salt Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $9.3 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.8 \pm 0.2^\circ 2\theta$, $16.0 \pm 0.2^\circ 2\theta$, $19.1 \pm 0.2^\circ 2\theta$, $21.3 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $26.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00233] In some embodiments of Compound 1 sodium salt Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $9.3 \pm 0.2^\circ 2\theta$, 13.0

$\pm 0.2^\circ 2\theta$, $14.8 \pm 0.2^\circ 2\theta$, $16.0 \pm 0.2^\circ 2\theta$, $19.1 \pm 0.2^\circ 2\theta$, $21.3 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $26.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00234] In some embodiments of Compound 1 sodium salt Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $9.3 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.8 \pm 0.2^\circ 2\theta$, $16.0 \pm 0.2^\circ 2\theta$, $19.1 \pm 0.2^\circ 2\theta$, $21.3 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $26.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00235] In some embodiments of Compound 1 sodium salt Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $9.3 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.8 \pm 0.2^\circ 2\theta$, $16.0 \pm 0.2^\circ 2\theta$, $19.1 \pm 0.2^\circ 2\theta$, $21.3 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $26.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00236] In some embodiments of Compound 1 sodium salt Type D, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $9.3 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.8 \pm 0.2^\circ 2\theta$, $16.0 \pm 0.2^\circ 2\theta$, $19.1 \pm 0.2^\circ 2\theta$, $21.3 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $26.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00237] In some embodiments of Compound 1 sodium salt Type D, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 29**.

[00238] In some embodiments of Compound 1 sodium salt Type D, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 30**.

Table 10: XRPD peaks table of Compound 1 Sodium Salt Type D

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	5.3423	49.13
2	9.2595	100.00
3	11.7134	1.37
4	13.0456	5.68
5	14.3999	2.89
6	14.8126	9.70
7	16.0105	12.11
8	16.2362	6.97
9	17.6829	4.29
10	19.1463	14.57
11	19.7096	8.34
12	21.3323	16.14
13	21.8676	5.13
14	22.6421	15.69
15	23.9377	1.56
16	25.1154	5.44
17	26.2189	7.84
18	26.7408	3.53
19	27.7633	5.49
20	28.6460	2.43
21	30.8338	4.35
22	32.1851	1.12
23	36.2205	0.97

Compound 1 Potassium Salt Type A

[00239] Disclosed herein is Compound 1 potassium salt Type A. In some embodiments, the crystalline form is Compound 1 potassium salt Type A characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 31** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $6.3 \pm 0.2^\circ 2\theta$, $13.3 \pm 0.2^\circ 2\theta$, and $20.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 32**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 33**; or
- (e) combinations thereof.

[00240] In some embodiments of Compound 1 potassium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 31** as measured using Cu K α radiation.

[00241] In some embodiments of Compound 1 potassium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 11 as measured using Cu K α radiation.

[00242] In some embodiments of Compound 1 potassium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.3 \pm 0.2^\circ 2\theta$, $13.3 \pm 0.2^\circ 2\theta$, and $20.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00243] In some embodiments of Compound 1 potassium salt Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $12.7 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, and $26.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00244] In some embodiments of Compound 1 potassium salt Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $18.8 \pm 0.2^\circ 2\theta$, $19.7 \pm 0.2^\circ 2\theta$, and $27.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00245] In some embodiments of Compound 1 potassium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.3 \pm 0.2^\circ 2\theta$, $12.7 \pm 0.2^\circ 2\theta$, $13.3 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $18.8 \pm 0.2^\circ 2\theta$, $19.7 \pm 0.2^\circ 2\theta$, $20.2 \pm 0.2^\circ 2\theta$, $26.5 \pm 0.2^\circ 2\theta$, and $27.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00246] In some embodiments of Compound 1 potassium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $6.3 \pm 0.2^\circ 2\theta$, $12.7 \pm 0.2^\circ 2\theta$, $13.3 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $18.8 \pm 0.2^\circ 2\theta$, $19.7 \pm 0.2^\circ 2\theta$, $20.2 \pm 0.2^\circ 2\theta$, $26.5 \pm 0.2^\circ 2\theta$, and $27.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00247] In some embodiments of Compound 1 potassium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $6.3 \pm 0.2^\circ 2\theta$, $12.7 \pm 0.2^\circ 2\theta$

20, $13.3 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $18.8 \pm 0.2^\circ 2\theta$, $19.7 \pm 0.2^\circ 2\theta$, $20.2 \pm 0.2^\circ 2\theta$, $26.5 \pm 0.2^\circ 2\theta$, and $27.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00248] In some embodiments of Compound 1 potassium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $6.3 \pm 0.2^\circ 2\theta$, $12.7 \pm 0.2^\circ 2\theta$, $13.3 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $18.8 \pm 0.2^\circ 2\theta$, $19.7 \pm 0.2^\circ 2\theta$, $20.2 \pm 0.2^\circ 2\theta$, $26.5 \pm 0.2^\circ 2\theta$, and $27.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00249] In some embodiments of Compound 1 potassium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $6.3 \pm 0.2^\circ 2\theta$, $12.7 \pm 0.2^\circ 2\theta$, $13.3 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $18.8 \pm 0.2^\circ 2\theta$, $19.7 \pm 0.2^\circ 2\theta$, $20.2 \pm 0.2^\circ 2\theta$, $26.5 \pm 0.2^\circ 2\theta$, and $27.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00250] In some embodiments of Compound 1 potassium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $6.3 \pm 0.2^\circ 2\theta$, $12.7 \pm 0.2^\circ 2\theta$, $13.3 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $18.8 \pm 0.2^\circ 2\theta$, $19.7 \pm 0.2^\circ 2\theta$, $20.2 \pm 0.2^\circ 2\theta$, $26.5 \pm 0.2^\circ 2\theta$, and $27.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00251] In some embodiments of Compound 1 potassium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $6.3 \pm 0.2^\circ 2\theta$, $12.7 \pm 0.2^\circ 2\theta$, $13.3 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $18.8 \pm 0.2^\circ 2\theta$, $19.7 \pm 0.2^\circ 2\theta$, $20.2 \pm 0.2^\circ 2\theta$, $26.5 \pm 0.2^\circ 2\theta$, and $27.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00252] In some embodiments of Compound 1 potassium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $6.3 \pm 0.2^\circ 2\theta$, $12.7 \pm 0.2^\circ 2\theta$, $13.3 \pm 0.2^\circ 2\theta$, $16.5 \pm 0.2^\circ 2\theta$, $18.8 \pm 0.2^\circ 2\theta$, $19.7 \pm 0.2^\circ 2\theta$, $20.2 \pm 0.2^\circ 2\theta$, $26.5 \pm 0.2^\circ 2\theta$, and $27.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00253] In some embodiments of Compound 1 potassium salt Type A, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 32**.

[00254] In some embodiments of Compound 1 potassium salt Type A, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 33**.

Table 11: XRPD peaks table of Compound 1 Potassium Salt Type A

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	6.3277	100.00
2	6.7360	89.35
3	8.2392	5.75
4	12.6590	17.67
5	13.2790	14.84
6	16.5049	10.51
7	18.8489	9.82
8	19.7047	12.54
9	20.2308	32.62
10	21.4902	7.92
11	22.2745	4.99
12	25.7629	7.44
13	26.4761	33.92

Peak#	Pos. [°2 θ]	Rel. Int. [%]
14	27.0739	15.69
15	29.8190	2.74
16	32.8332	6.74
17	33.2671	4.96
18	33.9147	2.90

Compound 1 Ammonium Salt Type A

[00255] Disclosed herein is Compound 1 ammonium salt Type A. In some embodiments, the crystalline form is Compound 1 ammonium salt Type A characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 34** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $11.9 \pm 0.2^\circ 2\theta$, $16.8 \pm 0.2^\circ 2\theta$, and $21.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 35**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 36**; or
- (e) combinations thereof.

[00256] In some embodiments of Compound 1 ammonium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 34** as measured using Cu K α radiation.

[00257] In some embodiments of Compound 1 ammonium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 12 as measured using Cu K α radiation.

[00258] In some embodiments of Compound 1 ammonium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $11.9 \pm 0.2^\circ 2\theta$, $16.8 \pm 0.2^\circ 2\theta$, and $21.8 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00259] In some embodiments of Compound 1 ammonium salt Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $6.0 \pm 0.2^\circ 2\theta$, $16.2 \pm 0.2^\circ 2\theta$, and $18.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00260] In some embodiments of Compound 1 ammonium salt Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $20.9 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $23.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00261] In some embodiments of Compound 1 ammonium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.0 \pm 0.2^\circ 2\theta$, $11.9 \pm 0.2^\circ 2\theta$, $16.2 \pm 0.2^\circ 2\theta$, $16.8 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $23.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00262] In some embodiments of Compound 1 ammonium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $6.0 \pm 0.2^\circ 2\theta$, $11.9 \pm 0.2^\circ 2\theta$,

$16.2 \pm 0.2^\circ 2\theta$, $16.8 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $23.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00263] In some embodiments of Compound 1 ammonium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $6.0 \pm 0.2^\circ 2\theta$, $11.9 \pm 0.2^\circ 2\theta$, $16.2 \pm 0.2^\circ 2\theta$, $16.8 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $23.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00264] In some embodiments of Compound 1 ammonium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $6.0 \pm 0.2^\circ 2\theta$, $11.9 \pm 0.2^\circ 2\theta$, $16.2 \pm 0.2^\circ 2\theta$, $16.8 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $23.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00265] In some embodiments of Compound 1 ammonium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $6.0 \pm 0.2^\circ 2\theta$, $11.9 \pm 0.2^\circ 2\theta$, $16.2 \pm 0.2^\circ 2\theta$, $16.8 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $23.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00266] In some embodiments of Compound 1 ammonium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $6.0 \pm 0.2^\circ 2\theta$, $11.9 \pm 0.2^\circ 2\theta$, $16.2 \pm 0.2^\circ 2\theta$, $16.8 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $23.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00267] In some embodiments of Compound 1 ammonium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $6.0 \pm 0.2^\circ 2\theta$, $11.9 \pm 0.2^\circ 2\theta$, $16.2 \pm 0.2^\circ 2\theta$, $16.8 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $23.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00268] In some embodiments of Compound 1 ammonium salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $6.0 \pm 0.2^\circ 2\theta$, $11.9 \pm 0.2^\circ 2\theta$, $16.2 \pm 0.2^\circ 2\theta$, $16.8 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $20.9 \pm 0.2^\circ 2\theta$, $21.8 \pm 0.2^\circ 2\theta$, $22.6 \pm 0.2^\circ 2\theta$, and $23.2 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00269] In some embodiments of Compound 1 ammonium salt Type A, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 35**.

[00270] In some embodiments of Compound 1 ammonium salt Type A, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 36**.

Table 12: XRPD peaks table of Compound 1 Ammonium Salt Type A

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	5.9504	37.43
2	7.0906	4.31
3	11.8555	100.00
4	12.2921	39.81
5	12.5032	21.19
6	13.4860	10.27
7	14.0401	14.72

Peak#	Pos. [°2 θ]	Rel. Int. [%]
8	14.2841	11.76
9	14.8941	10.06
10	15.3622	4.38
11	16.1798	26.37
12	16.8443	30.64
13	18.2414	70.78
14	19.0433	3.81
15	19.8717	12.76
16	20.8813	20.54
17	21.8368	25.51
18	22.5819	22.52
19	23.1627	21.63
20	23.6081	12.69
21	24.3909	21.23
22	25.0572	9.59
23	26.3045	7.30
24	27.1278	12.24
25	27.5556	7.14
26	27.9871	5.05
27	28.7263	9.64
28	29.4361	2.76
29	29.9604	4.26
30	31.1840	7.49
31	32.2099	3.78
32	33.2350	4.44
33	33.9951	3.45
34	35.4712	3.35
35	38.6305	2.10

Compound 1 Ammonium Salt Type B

[00271] Disclosed herein is Compound 1 ammonium salt Type B. In some embodiments, the crystalline form is Compound 1 ammonium salt Type B characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 37** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $6.5 \pm 0.2^\circ 2\theta$, $14.7 \pm 0.2^\circ 2\theta$, and $26.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 38**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 39**; or
- (e) combinations thereof.

[00272] In some embodiments of Compound 1 ammonium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 37** as measured using Cu K α radiation.

[00273] In some embodiments of Compound 1 ammonium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 13 as measured using Cu K α radiation.

[00274] In some embodiments of Compound 1 ammonium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.5 \pm 0.2^\circ 2\theta$, $14.7 \pm 0.2^\circ 2\theta$, and $26.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00275] In some embodiments of Compound 1 ammonium salt Type B, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $13.0 \pm 0.2^\circ 2\theta$ and $19.5 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00276] In some embodiments of Compound 1 ammonium salt Type B, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $18.1 \pm 0.2^\circ 2\theta$, $20.1 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00277] In some embodiments of Compound 1 ammonium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.5 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.7 \pm 0.2^\circ 2\theta$, $18.1 \pm 0.2^\circ 2\theta$, $19.5 \pm 0.2^\circ 2\theta$, $20.1 \pm 0.2^\circ 2\theta$, $26.1 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00278] In some embodiments of Compound 1 ammonium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.7 \pm 0.2^\circ 2\theta$, $18.1 \pm 0.2^\circ 2\theta$, $19.5 \pm 0.2^\circ 2\theta$, $20.1 \pm 0.2^\circ 2\theta$, $26.1 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00279] In some embodiments of Compound 1 ammonium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.7 \pm 0.2^\circ 2\theta$, $18.1 \pm 0.2^\circ 2\theta$, $19.5 \pm 0.2^\circ 2\theta$, $20.1 \pm 0.2^\circ 2\theta$, $26.1 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00280] In some embodiments of Compound 1 ammonium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.7 \pm 0.2^\circ 2\theta$, $18.1 \pm 0.2^\circ 2\theta$, $19.5 \pm 0.2^\circ 2\theta$, $20.1 \pm 0.2^\circ 2\theta$, $26.1 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00281] In some embodiments of Compound 1 ammonium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.7 \pm 0.2^\circ 2\theta$, $18.1 \pm 0.2^\circ 2\theta$, $19.5 \pm 0.2^\circ 2\theta$, $20.1 \pm 0.2^\circ 2\theta$, $26.1 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00282] In some embodiments of Compound 1 ammonium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.7 \pm 0.2^\circ 2\theta$, $18.1 \pm 0.2^\circ 2\theta$, $19.5 \pm 0.2^\circ 2\theta$, $20.1 \pm 0.2^\circ 2\theta$, $26.1 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00283] In some embodiments of Compound 1 ammonium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$

20, $14.7 \pm 0.2^\circ 2\theta$, $18.1 \pm 0.2^\circ 2\theta$, $19.5 \pm 0.2^\circ 2\theta$, $20.1 \pm 0.2^\circ 2\theta$, $26.1 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00284] In some embodiments of Compound 1 ammonium salt Type B, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $6.5 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.7 \pm 0.2^\circ 2\theta$, $18.1 \pm 0.2^\circ 2\theta$, $19.5 \pm 0.2^\circ 2\theta$, $20.1 \pm 0.2^\circ 2\theta$, $26.1 \pm 0.2^\circ 2\theta$, and $26.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00285] In some embodiments of Compound 1 ammonium salt Type B, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 38**.

[00286] In some embodiments of Compound 1 ammonium salt Type B, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 39**.

Table 13: XRPD peaks table of Compound 1 Ammonium Salt Type B

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	6.4889	100.00
2	12.9667	15.45
3	14.6711	18.20
4	18.0515	10.28
5	19.4723	28.97
6	20.0919	15.70
7	22.4875	3.78
8	26.1017	22.55
9	26.9252	8.10
10	28.8657	4.99
11	32.0190	4.56

Compound 1 Ammonium Salt Type C

[00287] Disclosed herein is Compound 1 ammonium salt Type C. In some embodiments, the crystalline form is Compound 1 ammonium salt Type C characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 40** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $6.1 \pm 0.2^\circ 2\theta$, $15.6 \pm 0.2^\circ 2\theta$, and $24.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 41**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 42**; or
- (e) combinations thereof.

[00288] In some embodiments of Compound 1 ammonium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 40** as measured using Cu K α radiation.

[00289] In some embodiments of Compound 1 ammonium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 14 as measured using Cu K α radiation.

[00290] In some embodiments of Compound 1 ammonium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.1 \pm 0.2^\circ 2\theta$, $15.6 \pm 0.2^\circ 2\theta$, and $24.4 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00291] In some embodiments of Compound 1 ammonium salt Type C, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $13.0 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, and $25.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00292] In some embodiments of Compound 1 ammonium salt Type C, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $12.2 \pm 0.2^\circ 2\theta$, $14.0 \pm 0.2^\circ 2\theta$, and $22.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00293] In some embodiments of Compound 1 ammonium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.1 \pm 0.2^\circ 2\theta$, $12.2 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.0 \pm 0.2^\circ 2\theta$, $15.6 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $24.4 \pm 0.2^\circ 2\theta$, and $25.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00294] In some embodiments of Compound 1 ammonium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $12.2 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.0 \pm 0.2^\circ 2\theta$, $15.6 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $24.4 \pm 0.2^\circ 2\theta$, and $25.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00295] In some embodiments of Compound 1 ammonium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $12.2 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.0 \pm 0.2^\circ 2\theta$, $15.6 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $24.4 \pm 0.2^\circ 2\theta$, and $25.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00296] In some embodiments of Compound 1 ammonium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $12.2 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.0 \pm 0.2^\circ 2\theta$, $15.6 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $24.4 \pm 0.2^\circ 2\theta$, and $25.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00297] In some embodiments of Compound 1 ammonium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $12.2 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.0 \pm 0.2^\circ 2\theta$, $15.6 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $24.4 \pm 0.2^\circ 2\theta$, and $25.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00298] In some embodiments of Compound 1 ammonium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $12.2 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.0 \pm 0.2^\circ 2\theta$, $15.6 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $24.4 \pm 0.2^\circ 2\theta$, and $25.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00299] In some embodiments of Compound 1 ammonium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $12.2 \pm 0.2^\circ 2\theta$

20, $13.0 \pm 0.2^\circ 2\theta$, $14.0 \pm 0.2^\circ 2\theta$, $15.6 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $24.4 \pm 0.2^\circ 2\theta$, and $25.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00300] In some embodiments of Compound 1 ammonium salt Type C, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $12.2 \pm 0.2^\circ 2\theta$, $13.0 \pm 0.2^\circ 2\theta$, $14.0 \pm 0.2^\circ 2\theta$, $15.6 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $24.4 \pm 0.2^\circ 2\theta$, and $25.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00301] In some embodiments of Compound 1 ammonium salt Type C, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 41**.

[00302] In some embodiments of Compound 1 ammonium salt Type C, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 42**.

Table 14: XRPD peaks table of Compound 1 Ammonium Salt Type C

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	6.0918	46.03
2	6.8917	19.97
3	12.1571	44.94
4	13.0416	92.20
5	13.9902	32.58
6	15.6028	100.00
7	19.2314	51.99
8	19.9124	37.71
9	22.0958	48.33
10	24.4122	49.46
11	25.6860	69.14
12	31.5761	21.21

Compound 1 L-Arginine Salt Type A

[00303] Disclosed herein is Compound 1 L-Arginine Salt Type A. In some embodiments, the crystalline form is Compound 1 L-Arginine Salt Type A characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 43** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $11.0 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, and $18.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 44**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 45**; or
- (e) combinations thereof.

[00304] In some embodiments of Compound 1 L-Arginine salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 43** as measured using Cu K α radiation.

[00305] In some embodiments of Compound 1 L-Arginine salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 15 as measured using Cu K α radiation.

[00306] In some embodiments of Compound 1 L-Arginine salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $11.0 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, and $18.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00307] In some embodiments of Compound 1 L-Arginine salt Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $6.1 \pm 0.2^\circ 2\theta$, $12.6 \pm 0.2^\circ 2\theta$, and $15.3 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00308] In some embodiments of Compound 1 L-Arginine salt Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $19.6 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00309] In some embodiments of Compound 1 L-Arginine salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.1 \pm 0.2^\circ 2\theta$, $11.0 \pm 0.2^\circ 2\theta$, $12.6 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, $15.3 \pm 0.2^\circ 2\theta$, $18.6 \pm 0.2^\circ 2\theta$, $19.6 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00310] In some embodiments of Compound 1 L-Arginine salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $11.0 \pm 0.2^\circ 2\theta$, $12.6 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, $15.3 \pm 0.2^\circ 2\theta$, $18.6 \pm 0.2^\circ 2\theta$, $19.6 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00311] In some embodiments of Compound 1 L-Arginine salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $11.0 \pm 0.2^\circ 2\theta$, $12.6 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, $15.3 \pm 0.2^\circ 2\theta$, $18.6 \pm 0.2^\circ 2\theta$, $19.6 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00312] In some embodiments of Compound 1 L-Arginine salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $11.0 \pm 0.2^\circ 2\theta$, $12.6 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, $15.3 \pm 0.2^\circ 2\theta$, $18.6 \pm 0.2^\circ 2\theta$, $19.6 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00313] In some embodiments of Compound 1 L-Arginine salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $11.0 \pm 0.2^\circ 2\theta$, $12.6 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, $15.3 \pm 0.2^\circ 2\theta$, $18.6 \pm 0.2^\circ 2\theta$, $19.6 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00314] In some embodiments of Compound 1 L-Arginine salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $11.0 \pm 0.2^\circ 2\theta$, $12.6 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, $15.3 \pm 0.2^\circ 2\theta$, $18.6 \pm 0.2^\circ 2\theta$, $19.6 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00315] In some embodiments of Compound 1 L-Arginine salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $11.0 \pm 0.2^\circ 2\theta$

20, $12.6 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, $15.3 \pm 0.2^\circ 2\theta$, $18.6 \pm 0.2^\circ 2\theta$, $19.6 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00316] In some embodiments of Compound 1 L-Arginine salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $6.1 \pm 0.2^\circ 2\theta$, $11.0 \pm 0.2^\circ 2\theta$, $12.6 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, $15.3 \pm 0.2^\circ 2\theta$, $18.6 \pm 0.2^\circ 2\theta$, $19.6 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00317] In some embodiments of Compound 1 L-Arginine salt Type A, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 44**.

[00318] In some embodiments of Compound 1 L-Arginine salt Type A, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 45**.

Table 15: XRPD peaks table of Compound 1 L-Arginine Salt Type A

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	6.1166	53.45
2	9.1438	19.07
3	11.0077	100.00
4	12.5937	71.54
5	12.9801	14.40
6	13.6583	52.26
7	15.2749	53.26
8	17.8303	24.47
9	18.3370	66.17
10	18.5972	84.25
11	19.5991	34.61
12	20.5220	33.83
13	21.2874	21.89
14	21.6581	43.44
15	22.8063	28.09
16	23.6239	33.78
17	26.0979	19.98
18	27.3617	14.96
19	27.9034	13.52
20	29.1813	9.98
21	33.1701	3.60
22	37.2506	4.54

Compound 1 Choline Salt Type A

[00319] Disclosed herein is Compound 1 Choline Salt Type A. In some embodiments, the crystalline form is Compound 1 Choline Salt Type A characterized as having at least one of the following properties:

- (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 46** as measured using Cu K α radiation;
- (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $11.4 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, and $20.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;

- (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 47**;
- (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 48**; or
- (e) combinations thereof.

[00320] In some embodiments of Compound 1 choline salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 46** as measured using Cu K α radiation.

[00321] In some embodiments of Compound 1 choline salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 16 as measured using Cu K α radiation.

[00322] In some embodiments of Compound 1 choline salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $11.4 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, and $20.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00323] In some embodiments of Compound 1 choline salt Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $12.5 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, and $24.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00324] In some embodiments of Compound 1 choline salt Type A, the X-ray powder diffraction (XRPD) pattern further comprises peaks at $5.3 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, and $22.9 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00325] In some embodiments of Compound 1 choline salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $5.3 \pm 0.2^\circ 2\theta$, $11.4 \pm 0.2^\circ 2\theta$, $12.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $22.9 \pm 0.2^\circ 2\theta$, and $24.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00326] In some embodiments of Compound 1 choline salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least two peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $11.4 \pm 0.2^\circ 2\theta$, $12.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $22.9 \pm 0.2^\circ 2\theta$, and $24.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00327] In some embodiments of Compound 1 choline salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least three peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $11.4 \pm 0.2^\circ 2\theta$, $12.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $22.9 \pm 0.2^\circ 2\theta$, and $24.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00328] In some embodiments of Compound 1 choline salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least four peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $11.4 \pm 0.2^\circ 2\theta$, $12.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $22.9 \pm 0.2^\circ 2\theta$, and $24.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00329] In some embodiments of Compound 1 choline salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least five peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $11.4 \pm 0.2^\circ 2\theta$,

$12.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $22.9 \pm 0.2^\circ 2\theta$, and $24.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00330] In some embodiments of Compound 1 choline salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least six peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $11.4 \pm 0.2^\circ 2\theta$, $12.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $22.9 \pm 0.2^\circ 2\theta$, and $24.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00331] In some embodiments of Compound 1 choline salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least seven peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $11.4 \pm 0.2^\circ 2\theta$, $12.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $22.9 \pm 0.2^\circ 2\theta$, and $24.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00332] In some embodiments of Compound 1 choline salt Type A, the crystalline form has an X-ray powder diffraction (XRPD) pattern with at least eight peaks selected from $5.3 \pm 0.2^\circ 2\theta$, $11.4 \pm 0.2^\circ 2\theta$, $12.5 \pm 0.2^\circ 2\theta$, $15.4 \pm 0.2^\circ 2\theta$, $18.2 \pm 0.2^\circ 2\theta$, $19.2 \pm 0.2^\circ 2\theta$, $20.6 \pm 0.2^\circ 2\theta$, $22.9 \pm 0.2^\circ 2\theta$, and $24.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

[00333] In some embodiments of Compound 1 choline salt Type A, the Differential Scanning Calorimetry (DSC) thermogram is substantially the same as shown in **FIG. 47**.

[00334] In some embodiments of Compound 1 choline salt Type A, the Thermogravimetric Thermal Analysis (TGA) thermogram is substantially the same as shown in **FIG. 48**.

Table 16: XRPD peaks table of Compound 1 Choline Salt Type A

Peak#	Pos. [$^\circ 2\theta$]	Rel. Int. [%]
1	5.2533	32.25
2	7.1274	9.88
3	8.4540	9.23
4	10.5829	21.09
5	11.3924	55.87
6	12.0548	54.90
7	12.5092	96.86
8	13.9590	24.41
9	14.3057	15.27
10	14.6501	25.07
11	15.3587	29.16
12	16.3995	45.83
13	16.9316	30.92
14	18.2448	100.00
15	18.7079	31.21
16	19.1836	87.71
17	19.5353	20.04
18	19.9674	11.41
19	20.5560	50.48
20	21.0237	22.39
21	21.5797	30.05
22	22.0418	19.51
23	22.9480	41.93
24	23.4065	39.32
25	23.7376	50.89

Peak#	Pos. [°2 θ]	Rel. Int. [%]
26	24.0495	85.28
27	24.3288	27.92
28	25.4236	30.70
29	26.1047	22.25
30	26.4021	30.03
31	27.1782	12.46
32	28.1458	4.56
33	28.8637	14.03
34	29.5743	4.67
35	31.6108	9.96
36	32.0574	9.39
37	32.5276	7.36
38	34.2386	7.09
39	34.6445	6.47

Method of Treatment

[00335] Disclosed herein is a method of treating a disease in which inhibition of KAT6A is beneficial, the method comprising administering a crystalline form disclosed herein. In some embodiment, the crystalline form is freeform Type B of Compound 1. In some embodiments, the method comprises administering a pharmaceutical composition comprising crystalline form disclosed herein.

[00336] Disclosed herein is a method of treating a disease or disorder associated with KAT6A, the method comprising administering to the subject crystalline form disclosed herein. In some embodiment, the crystalline form is freeform Type B of Compound 1. In some embodiments, the method comprises administering a pharmaceutical composition comprising crystalline form disclosed herein.

[00337] In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal crystalline form disclosed herein. In some embodiment, the crystalline form is freeform Type B of Compound 1.

[00338] In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form (such as the crystalline form is freeform Type B of Compound 1) disclosed herein, wherein the cancer is selected from lung cancer, mesothelioma, bone cancer, pancreatic cancer, skin cancer, cancer of the head or neck, cutaneous or intraocular melanoma, uterine cancer, ovarian cancer, rectal cancer, stomach cancer, hepatocellular carcinoma, colon cancer, breast cancer, carcinoma of the endometrium, carcinoma of the cervix, carcinoma of the vagina, Hodgkin's disease, cancer of the esophagus, cancer of the small intestine, cancer of the endocrine system, cancer of the thyroid gland, cancer of the parathyroid gland, cancer of the adrenal gland, sarcoma of soft tissue, cancer of the urethra, cancer of the penis, prostate cancer, hematology malignancy, chronic or acute leukemia, lymphocytic lymphomas, cancer of the bladder, cancer of the kidney or ureter, renal cell carcinoma, carcinoma of the renal pelvis, neoplasms of the central nervous system (CNS), primary CNS lymphoma, spinal axis tumors, glioblastoma, brain stem glioma, pituitary adenoma, or a combination of two or more of the foregoing cancers. In some embodiment the method is a method of treating breast cancer in a mammal in need thereof, comprising administering to the mammal the crystalline freeform Type B of Compound 1.

[00339] In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein (such as the crystalline form is freeform Type B of Compound 1), wherein the cancer is selected from ER-positive breast cancer, glioblastoma, non-small cell lung cancer (NSCLC), small cell lung cancer (SCLC), melanoma, ovarian cancer, prostate cancer, pancreatic cancer, colorectal cancer (CRC), hepatocellular carcinoma (HCC), renal cell carcinoma (RCC), leukemia, lymphoma or multiple myeloma, acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL), chronic myeloid leukemia (CML), and non-Hodgkin's lymphoma. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is ER-positive breast cancer. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is glioblastoma. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is non-small cell lung cancer (NSCLC). In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is small cell lung cancer (SCLC). In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is melanoma. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is ovarian cancer. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is prostate cancer. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is pancreatic cancer. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is colorectal cancer (CRC). In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is hepatocellular carcinoma (HCC). In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is renal cell carcinoma (RCC). In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is leukemia. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is lymphoma. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is multiple myeloma. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is acute lymphocytic leukemia (ALL). In some embodiments is a method of treating cancer in a mammal in need thereof,

thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is acute myeloid leukemia (AML). In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is chronic lymphocytic leukemia (CLL). In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is chronic myeloid leukemia (CML). In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is non-Hodgkin's lymphoma. In some embodiment, the crystalline form is freeform Type B of Compound 1. In some embodiment the method is a method of treating ER-positive breast cancer in a mammal in need thereof, comprising administering to the mammal the crystalline freeform Type B of Compound 1.

[00340] In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is a solid tumor with KAT6A/6B amplification or overexpression, or leukemia or solid tumor with KAT6A/6B fusion protein resulting from chromosomal translocation. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is a solid tumor with KAT6A/6B amplification or overexpression. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is a leukemia or solid tumor with KAT6A/6B fusion protein resulting from chromosomal translocation. In some embodiment, the crystalline form is freeform Type B of Compound 1.

[00341] In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is a MYST overexpressing cancer. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer overexpresses more than one KATs of the MYST family. In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer overexpresses more than one KATs of the MYST family selected from TIP60, KAT6A, KAT6B, HBO1, and MOF. In some embodiment, the crystalline form is freeform Type B of Compound 1.

[00342] In some embodiments is a method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer is a bromodomain overexpressing cancer. In some embodiments is a method of treating a bromodomain overexpressing cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form disclosed herein, wherein the cancer overexpresses one or more bromodomain proteins selected from BRD2, BRD3, BRD4, BRD7, BRD8, BRD9, BRDT, TAF1/TAF1L, TFIID, SMARC2, and SMARC4. In some embodiment, the crystalline form is freeform Type B of Compound 1.

Dosing

[00343] In certain embodiments, the compositions containing the compound(s) described herein are administered for prophylactic and/or therapeutic treatments. In certain therapeutic applications, the compositions are administered to a patient already suffering from a disease or condition, in an amount sufficient to cure or at least partially arrest at least one of the symptoms of the disease or condition. Amounts effective for this use depend on the severity and course of the disease or condition, previous therapy, the patient's health status, weight, and response to the drugs, and the judgment of the treating physician. Therapeutically effective amounts are optionally determined by methods including, but not limited to, a dose escalation and/or dose ranging clinical trial.

[00344] In prophylactic applications, compositions containing the compounds described herein are administered to a patient susceptible to or otherwise at risk of a particular disease, disorder or condition. Such an amount is defined to be a "prophylactically effective amount or dose." In this use, the precise amounts also depend on the patient's state of health, weight, and the like. When used in patients, effective amounts for this use will depend on the severity and course of the disease, disorder or condition, previous therapy, the patient's health status and response to the drugs, and the judgment of the treating physician. In one aspect, prophylactic treatments include administering to a mammal, who previously experienced at least one symptom of or risk factor for the disease being treated and is currently in remission, a pharmaceutical composition comprising a compound described herein, or a pharmaceutically acceptable salt thereof, in order to prevent a return of the symptoms of the disease or condition.

[00345] In certain embodiments wherein the patient's condition does not improve, upon the doctor's discretion the administration of the compounds are administered chronically, that is, for an extended period of time, including throughout the duration of the patient's life in order to ameliorate or otherwise control or limit the symptoms of the patient's disease or condition.

[00346] In any of the aforementioned aspects are further embodiments in which the effective amount of the compound described herein, or a pharmaceutically acceptable salt thereof, is: (a) systemically administered to the mammal; and/or (b) administered orally to the mammal; and/or (c) intravenously administered to the mammal; and/or (d) administered by injection to the mammal; and/or (e) administered topically to the mammal; and/or (f) administered non-systemically or locally to the mammal.

Routes of Administration

[00347] Suitable routes of administration include, but are not limited to, oral, intravenous, rectal, aerosol, parenteral, ophthalmic, pulmonary, transmucosal, transdermal, vaginal, otic, nasal, and topical administration. In addition, by way of example only, parenteral delivery includes intramuscular, subcutaneous, intravenous, intramedullary injections, as well as intrathecal, direct intraventricular, intraperitoneal, intralymphatic, and intranasal injections.

Pharmaceutical Compositions/Formulations

[00348] The compounds described herein are administered to a subject in need thereof, either alone or in combination with pharmaceutically acceptable carriers, excipients or diluents, in a pharmaceutical composition, according to standard pharmaceutical practice. In one embodiment, the compounds of this disclosure may be administered to animals. The compounds can be administered orally or parenterally, including the intravenous, intramuscular, intraperitoneal, subcutaneous, rectal and topical routes of administration.

[00349] In another aspect, provided herein are pharmaceutical compositions comprising a crystalline form disclosed herein, and at least one pharmaceutically acceptable excipient.

[00350] Pharmaceutical compositions are formulated in a conventional manner using one or more pharmaceutically acceptable excipients that facilitate processing of the active compounds into preparations that can be used pharmaceutically. Proper formulation is dependent upon the route of administration chosen. A summary of pharmaceutical compositions described herein can be found, for example, in Remington: The Science and Practice of Pharmacy, Nineteenth Ed (Easton, Pa.: Mack Publishing Company, 1995); Hoover, John E., Remington's Pharmaceutical Sciences, Mack Publishing Co., Easton, Pennsylvania 1975; Liberman, H.A. and Lachman, L., Eds., Pharmaceutical Dosage Forms, Marcel Decker, New York, N.Y., 1980; and Pharmaceutical Dosage Forms and Drug Delivery Systems, Seventh Ed. (Lippincott Williams & Wilkins 1999), herein incorporated by reference for such disclosure.

[00351] In some embodiments, the pharmaceutically acceptable excipient is selected from carriers, binders, filling agents, suspending agents, flavoring agents, sweetening agents, disintegrating agents, dispersing agents, surfactants, lubricants, colorants, diluents, solubilizers, moistening agents, plasticizers, stabilizers, penetration enhancers, wetting agents, anti-foaming agents, antioxidants, preservatives, and any combinations thereof.

[00352] The pharmaceutical compositions described herein are administered to a subject by appropriate administration routes, including, but not limited to, oral, parenteral (e.g., intravenous, subcutaneous, intramuscular), intranasal, buccal, topical, rectal, or transdermal administration routes. The pharmaceutical formulations described herein include, but are not limited to, aqueous liquid dispersions, liquids, gels, syrups, elixirs, slurries, suspensions, self-emulsifying dispersions, solid solutions, liposomal dispersions, aerosols, solid oral dosage forms, powders, immediate release formulations, controlled release formulations, fast melt formulations, tablets, capsules, pills, powders, dragees, effervescent formulations, lyophilized formulations, delayed release formulations, extended release formulations, pulsatile release formulations, multiparticulate formulations, and mixed immediate and controlled release formulations.

[00353] Pharmaceutical compositions including compounds described herein, or a pharmaceutically acceptable salt or solvate thereof are manufactured in a conventional manner, such as, by way of example only, by means of conventional mixing, dissolving, granulating, dragee-making, levigating, emulsifying, encapsulating, entrapping, or compression processes.

[00354] Pharmaceutical compositions for oral use are obtained by mixing one or more solid excipient with one or more of the compounds described herein, optionally grinding the resulting mixture, and processing the mixture of granules, after adding suitable auxiliaries, if desired, to obtain tablets or dragee cores. Suitable excipients include, for example, fillers such as sugars, including lactose, sucrose, mannitol, or sorbitol; cellulose preparations such as, for example, maize starch, wheat starch, rice starch, potato starch, gelatin, gum tragacanth, methylcellulose, microcrystalline cellulose, hydroxypropylmethylcellulose, sodium carboxymethylcellulose; or others such as polyvinylpyrrolidone (PVP or povidone) or calcium phosphate. If desired, disintegrating agents are added, such as the cross-linked croscarmellose sodium, polyvinylpyrrolidone, agar, or alginic acid or a salt thereof such as sodium alginate. In some embodiments, dyestuffs or pigments are added to the tablets or dragee coatings for identification or to characterize different combinations of active compound doses.

[00355] Pharmaceutical compositions that are administered orally include push-fit capsules made of gelatin, as well as soft, sealed capsules made of gelatin and a plasticizer, such as glycerol or sorbitol. The push-fit capsules contain the active ingredients in admixture with filler such as lactose, binders such as starches, and/or lubricants such as talc or magnesium stearate and, optionally, stabilizers. In soft capsules, the active compounds are dissolved or suspended in suitable liquids, such as fatty oils, liquid paraffin, or liquid polyethylene glycols. In some embodiments, stabilizers are added.

[00356] Pharmaceutical compositions for parental use are formulated as infusions or injections. In some embodiments, the pharmaceutical composition suitable for injection or infusion includes sterile aqueous solutions, or dispersions, or sterile powders comprising a compound described herein, or a pharmaceutically acceptable salt or solvate thereof. In some embodiments, the pharmaceutical composition comprises a liquid carrier. In some embodiments, the liquid carrier is a solvent or liquid dispersion medium comprising, for example, water, saline, ethanol, a polyol (for example, glycerol, propylene glycol, liquid polyethylene glycols, and the like), vegetable oils, nontoxic glyceryl esters, and any combinations thereof. In some embodiments, the pharmaceutical compositions further comprise a preservative to prevent growth of microorganisms.

Definitions

[00357] Unless otherwise stated, the following terms used in this application have the definitions given below. The use of the term “including” as well as other forms, such as “include”, “includes,” and “included,” is not limiting. The section headings used herein are for organizational purposes only and are not to be construed as limiting the subject matter described.

[00358] The term “acceptable” with respect to a formulation, composition or ingredient, as used herein, means having no persistent detrimental effect on the general health of the subject being treated.

[00359] The terms “administer,” “administering,” “administration,” and the like, as used herein, refer to the methods that may be used to enable delivery of compounds or compositions to the desired site of biological action. These methods include, but are not limited to oral routes, intraduodenal routes, parenteral injection (including intravenous, subcutaneous, intraperitoneal, intramuscular, intravascular or

infusion), topical and rectal administration. Those of skill in the art are familiar with administration techniques that can be employed with the compounds and methods described herein. In some embodiments, the compounds and compositions described herein are administered orally.

[00360] The terms “effective amount” or “therapeutically effective amount,” as used herein, refer to a sufficient amount of an agent or a compound being administered, which will relieve to some extent one or more of the symptoms of the disease or condition being treated. The result includes reduction and/or alleviation of the signs, symptoms, or causes of a disease, or any other desired alteration of a biological system. For example, an “effective amount” for therapeutic uses is the amount of the composition comprising a compound as disclosed herein required to provide a clinically significant decrease in disease symptoms. An appropriate “effective” amount in any individual case is optionally determined using techniques, such as a dose escalation study.

[00361] The terms “enhance” or “enhancing,” as used herein, means to increase or prolong either in potency or duration a desired effect. Thus, in regard to enhancing the effect of therapeutic agents, the term “enhancing” refers to the ability to increase or prolong, either in potency or duration, the effect of other therapeutic agents on a system. An “enhancing-effective amount,” as used herein, refers to an amount adequate to enhance the effect of another therapeutic agent in a desired system.

[00362] The term “subject” or “patient” encompasses mammals. Examples of mammals include, but are not limited to, any member of the Mammalian class: humans, non-human primates such as chimpanzees, and other apes and monkey species; farm animals such as cattle, horses, sheep, goats, swine; domestic animals such as rabbits, dogs, and cats; laboratory animals including rodents, such as rats, mice and guinea pigs, and the like. In one aspect, the mammal is a human.

[00363] The terms “treat,” “treating” or “treatment,” as used herein, include alleviating, abating or ameliorating at least one symptom of a disease or condition, preventing additional symptoms, inhibiting the disease or condition, e.g., arresting the development of the disease or condition, relieving the disease or condition, causing regression of the disease or condition, relieving a condition caused by the disease or condition, or stopping the symptoms of the disease or condition either prophylactically and/or therapeutically.

[00364] The term “about” means within a statistically meaningful range of a value, such as a stated concentration range, time frame, molecular weight, particle size, temperature, or pH. Such a range can be within an order of magnitude, typically within 10%, more typically within 5%, and even more typically within 3% of the indicated value or range. Sometimes, such a range can be within the experimental error typical of standard methods used for the measurement and/or determination of a given value or range. The allowable variation encompassed by the term “about” will depend upon the particular system under study, and can be readily appreciated by one of ordinary skill in the art. Whenever a range is recited within this application, every whole number integer within the range is also contemplated as an embodiment of the disclosure. In the context of the disclosure, when used or whether or not used the word, such as “about”, it means that within a given value or range of 10%, appropriately within 5%, especially within 1%.

[00365] If multiple diffraction patterns are available, then assessments of particle statistics (PS) and/or preferred orientation (PO) are possible. Consistency of relative intensity among XRPD patterns from multiple diffractometers indicates good orientation statistics. Alternatively, the observed XRPD pattern may be compared with a calculated XRPD pattern based upon a single crystal structure, if available. Two-dimensional scattering patterns using area detectors can also be used to evaluate PS/PO. If the effects of both PS and PO are determined to be negligible, then the XRPD pattern is representative of the powder average intensity for the sample and prominent peaks may be identified as “Representative Peaks.” In general, the more data collected to determine Representative Peaks, the more confident one can be of the classification of those peaks.

[00366] “Characteristic peaks,” to the extent they exist, are a subset of representative peaks and are used to differentiate one crystalline polymorph from another crystalline polymorph (polymorphs being crystalline forms having the same chemical composition). Characteristic peaks are determined by evaluating which representative peaks, if any, are present in one crystalline polymorph of a compound against all other known crystalline polymorphs of that compound to within $\pm 0.2^\circ 2\theta$. Not all crystalline polymorphs of a compound necessarily have at least one characteristic peak.

[00367] The term “preferred orientation” as used herein refers to an extreme case of non-random distribution of the crystallites of a solid state form. In XRPD, the ideal sample is homogenous and the crystallites are randomly distributed in the bulk solid. In a truly random sample, each possible reflection from a given set of planes will have an equal number of crystallites contributing to it. However, when the solid state form is in a preferred orientation this is not the case. Accordingly, comparing the intensity between a randomly oriented diffraction pattern and a preferred oriented diffraction pattern can look entirely different. Quantitative analysis depending on intensity ratios are greatly distorted by preferred orientation. Careful sample preparation is important for decreasing the incidence of a preferred orientation.

[00368] The term “substantially the same,” as used herein to reference a figure is intended to mean that the figure is considered representative of the type and kind of characteristic data that is obtained by a skilled artisan in view of deviations acceptable in the art. Such deviations may be caused by factors related to sample size, sample preparation, particular instrument used, operation conditions, and other experimental condition variations known in the art. For example, one skilled in the art can appreciate that the endotherm onset and peak temperatures as measured by differential scanning calorimetry (DSC) may vary significantly from experiment to experiment. For example, one skilled in the art can readily identify whether two X-ray diffraction patterns or two DSC thermograms are substantially the same. In some embodiments, when characteristic peaks of two X-ray diffraction patterns do not vary more than $\pm 0.2^\circ 2\theta$, it is deemed that the X-ray diffraction patterns are substantially the same.

[00369] As used herein, salts of Compound 1 include compounds where the corresponding acid is in an ionized, non-ionized, associated, or unassociated form. In some embodiments, the corresponding acid is in an ionized and/or associated forms. In some embodiments, the corresponding acid is in a nonionized and/or unassociated forms. Salts of Compound 1 also include mono-acid, di-acid, etc. forms of the salts.

Dosing

[00370] In certain embodiments, the compositions containing the crystalline form described herein are administered for prophylactic and/or therapeutic treatments. In certain therapeutic applications, the compositions are administered to a patient already suffering from a disease or condition, in an amount sufficient to cure or at least partially arrest at least one of the symptoms of the disease or condition. Amounts effective for this use depend on the severity and course of the disease or condition, previous therapy, the patient's health status, weight, and response to the drugs, and the judgment of the treating physician. Therapeutically effective amounts are optionally determined by methods including, but not limited to, a dose escalation and/or dose ranging clinical trial.

[00371] In certain embodiments wherein the patient's condition does not improve, upon the doctor's discretion the administration of the compounds are administered chronically, that is, for an extended period of time, including throughout the duration of the patient's life in order to ameliorate or otherwise control or limit the symptoms of the patient's disease or condition.

[00372] The amount of a given agent that corresponds to such an amount varies depending upon factors such as the particular compound, disease condition and its severity, the identity (*e.g.*, weight, sex) of the subject or host in need of treatment, but nevertheless is determined according to the particular circumstances surrounding the case, including, *e.g.*, the specific agent being administered, the route of administration, the condition being treated, and the subject or host being treated.

[00373] In general, however, doses employed for adult human treatment are typically in the range of 0.01 mg-5000 mg per day. In one aspect, doses employed for adult human treatment are from about 1 mg to about 1000 mg per day. In one embodiment, the desired dose is conveniently presented in a single dose or in divided doses administered simultaneously or at appropriate intervals, for example as two, three, four or more sub-doses per day.

[00374] In one embodiment, the daily dosages appropriate for the crystalline form described herein, or a pharmaceutically acceptable salt thereof, are from about 0.01 to about 50 mg/kg per body weight. In some embodiments, the daily dosage, or the amount of active in the dosage form are lower or higher than the ranges indicated herein, based on a number of variables in regard to an individual treatment regime. In various embodiments, the daily and unit dosages are altered depending on a number of variables including, but not limited to, the activity of the compound used, the disease or condition to be treated, the mode of administration, the requirements of the individual subject, the severity of the disease or condition being treated, and the judgment of the practitioner.

[00375] In any of the aforementioned aspects are further embodiments in which the effective amount of the crystalline form described herein, or a pharmaceutically acceptable salt thereof, is: (a) systemically administered to the mammal; and/or (b) administered orally to the mammal; and/or (c) intravenously administered to the mammal; and/or (d) administered by injection to the mammal; and/or (e)

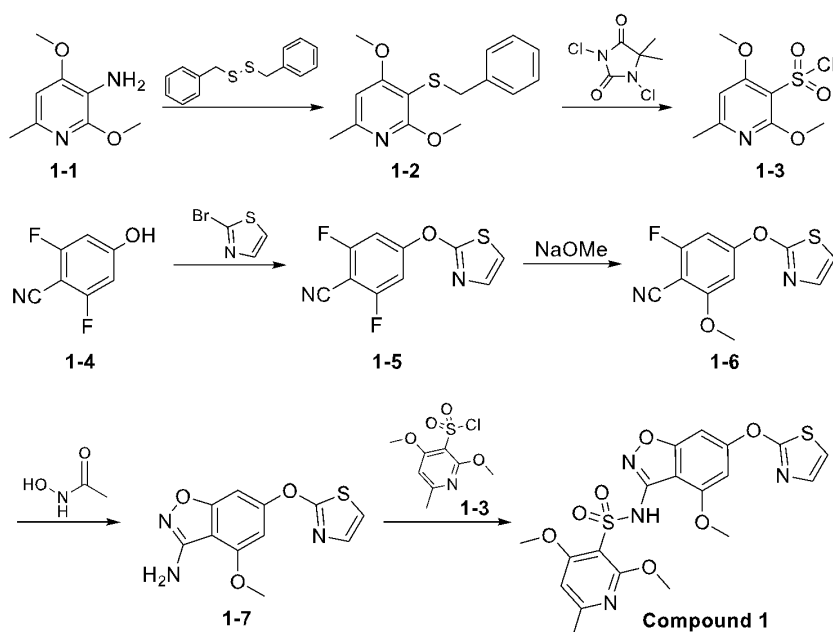
administered topically to the mammal; and/or (f) administered non-systemically or locally to the mammal.

[00376] In any of the aforementioned aspects are further embodiments comprising single administrations of the effective amount of the crystalline form disclosed herein, including further embodiments in which (i) the compound is administered once a day; or (ii) the compound is administered to the mammal multiple times over the span of one day.

EXAMPLES

[00377] The following examples are provided for illustrative purposes only and not to limit the scope of the claims provided herein.

Example 1: Preparation of Freeform Compound 1 Type A



[00378] To a mixture of **1-1** (10.0 g, 59.5 mmol) in MeCN (100 mL) were added dibenzyl disulfide (29.3 g, 119 mmol) and L-ascorbic acid (5.24 g, 29.8 mmol). Then isoamyl nitrite (25.8 g, 220 mmol) was added to this reaction mixture at 0 °C and this reaction mixture was stirred at 25 °C for 12 h. The reaction mixture was concentrated under reduced pressure. The residue was purified by flash silica gel chromatography to afford **1-2** (4.4 g, 27% yield) as a yellow oil. LCMS: 276.1 [M+H]⁺.

[00379] To a mixture of **1-2** (1.00 g, 3.63 mmol) in MeCN (20 mL), AcOH (2.5 mL) and water (5 mL) was added 1,3-dichloro-5,5-dimethylhydantoin (858 mg, 4.36 mmol) at -15 °C. This reaction mixture was stirred at -15-25 °C for 1 h. Water (10 mL) was added to the mixture. The mixture was extracted with DCM (20 mL x 3). The combined organic phase was washed with brine, dried over anhydrous Na₂SO₄, and filtered. The filtrate was concentrated under reduced pressure. The residue was purified by

flash silica gel chromatography to afford **1-3** (660 mg, 72% yield) as a white solid. LCMS: 251.9 [M+H]⁺.

[00380] To a solution of **1-4** (5 g, 32.2 mmol) in xylene (30 mL) were added 2-bromo-1,3-thiazole (15.9 g, 96.7 mmol), Josiphos SL-J009-1 Pd G3 (0.9 g, 0.97 mmol) and K₂CO₃ (8.9 g, 64.4 mmol, 100 mesh). The reaction mixture was stirred at 150°C under N₂ for 48 h. The mixture was filtered and concentrated. The obtained residue was purified by flash silica gel chromatography to afford the **1-5** (2.5 g, 32% yield) as a yellow solid. LCMS: 239.1 [M+H]⁺.

[00381] To a solution of **1-5** (11 g, 46.18 mmol) in THF (110 mL) was added sodium methanolate (2.49 g, 46.18 mmol). The reaction mixture was stirred at room temperature under N₂ for 1 h. Water was added. The mixture was extracted with DCM. The combined organic phase was washed with brine, dried over anhydrous Na₂SO₄, and filtered. The residue was purified by flash silica gel chromatography to afford the **1-6** (8.6 g, 74% yield) as a yellow solid. LCMS: 251.1 [M+H]⁺.

[00382] To a solution of **1-6** (8.6 g, 34.37 mmol) in MeCN (90 mL) and H₂O (10 mL) were added 1,1,3,3-tetramethylguanidine (23.75 g, 206.19 mmol) and N-hydroxyacetamide (7.74 g, 103.10 mmol). The reaction mixture was stirred at 70°C under N₂ for 6 h. The mixture was concentrated. Water was added. The mixture was extracted with DCM. The combined organic phase was washed with brine, dried over anhydrous Na₂SO₄, and filtered. The residue was purified by flash silica gel chromatography to afford the **1-7** (4.8 g, 53%) as a white solid. LCMS: 264.1 [M+H]⁺.

[00383] To a solution of **1-7** (5 g, 19 mmol) in MeCN (50 mL) was added **1-3** (7.2 g, 28 mmol). The mixture was stirred at 25 °C for 1 h. DMSO (150 mg, 1.9 mmol) and 3,5-lutidine (6.1 g, 57 mmol) were added. The reaction mixture was stirred at 25 °C for 1.5 h. The mixture was then concentrated. The obtained residue was first purified by flash silica gel chromatography to give a solid which was then lyophilized (MeCN/H₂O) to afford compound **1** as a white solid. Take sample of the white solid for XRPD, DSC, TGA, ¹H-NMR, and LCMS analysis. LCMS: 479.2 [M+H]⁺. ¹H NMR (400 MHz, DMSO-*d*₆) δ 10.13 (s, 1H), 7.37-7.31 (m, 2H), 7.26 (d, J = 1.6 Hz, 1H), 6.89 (d, J = 1.6 Hz, 1H), 6.82 (s, 1H), 3.89 (s, 3H), 3.84 (s, 3H), 3.82 (s, 3H), 2.39 (s, 3H).

[00384] The XRPD pattern of the obtained solid is shown in **FIG. 2**. Major peaks and their related intensities in the XRPD pattern are shown in Table 1. DSC and TGA results are shown in **FIG. 3** and **FIG. 4**.

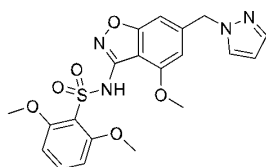
[00385] Inhibition of KAT6A enzymatic activity Compound **1** was determined using a radiometric 384-well format assay. A 10-point serial dilution of Compound **1** were conducted in DMSO and then a volume of 200 nL was transferred into 384-well assay plate by Echo (Labcyte). 10 μL of 2x enzyme solution (5 nM KAT6A (Active Motif) in assay buffer (50 mM Tris-HCl pH 8.0, 50 mM KCl, 0.1 mM EDTA, 5% glycerol, 1 mM DTT)) was dispensed into assay plate except for low control wells, in which 10 μL of assay buffer was transferred. The plate was incubated at room temperature for 15 min before addition of 10 μL of 2x [³H]-acetyl coenzyme A (Ac-CoA) and substrate peptide mix solution (500 nM (KAT6A) [³H]-Ac-CoA (PerkinElmer) and 800 nM (KAT6A) biotinylated H4(1-30) peptide (GL Biochem) in assay buffer) to each well to start reaction. The plate was incubated at room temperature for 60 min

(KAT6A), and then the reaction was stopped by adding 10 μ L of stop solution (cold Ac-CoA (Cayman) in 1x assay buffer). 25 μ L of reaction in each well was transferred to Flashplate (PerkinElmer) and incubated for another 1 hour at room temperature. The plate was read on Microbeta and the inhibition percentage of each compound treated well was calculated based on the equation $\text{inh \%} = (\text{Max-sample}) / (\text{Max-Min}) * 100$ where Max is signal from high control wells with enzyme, and Min is signal from low control wells with assay buffer only. The inh% data were further fit in XL-Fit to obtain IC50 values using a 4-parameter logistic (4PL) sigmoidal curve model. KAT6A IC50s for Compound 1 is 5.9 nM.

[00386] Permeability of Compound 1 was determined in Caco-2 Assay. Caco-2 cells purchased from ATCC were seeded onto polyethylene membranes (PET) in 96-well Corning Insert plates at 1×10^5 cells/ cm^2 , and refreshed medium every 4~5 days until to the 21st to 28th day for confluent cell monolayer formation. The transport buffer in the study was HBSS with 10.0 mM HEPES at pH 7.40 ± 0.05 . Compound 1 was tested at 2.00 μ M bi-directionally in duplicate. Final DMSO concentration was adjusted to less than 1%. The plate was incubated for 2 hours in CO₂ incubator at $37 \pm 1^\circ\text{C}$, with 5% CO₂ at saturated humidity without shaking. And all samples after mixed with acetonitrile containing internal standard were centrifuged at 3200 xg for 10 min. Concentrations of test and control compounds in starting solution, donor solution, and receiver solution were quantified by LC-MS/MS methodologies, using peak area ratio of analyte/internal standard. After transport assay, lucifer yellow rejection assay was applied to determine the Caco-2 cell monolayer integrity. Permeability results of Compound 1 and PF-9363 are shown in the table below.

Compound	Mean P_{app} (10^{-6} cm/s) A to B	Efflux Ratio
PF-9363*	0.628	42.4
1	3.38	6.28

* PF-9363 is Example 98 in WO2020/254946 A1 having the following structure:



Example 2: Preparation of Freeform Amorphous of compound 1

[00387] 400.2 mg Freeform Compound 1 Type A was dissolved in 5 mL DCM and filter it by 0.45 μ m PTFE membrane. Concentrate the clear solution to dryness via rotary evaporation at 40°C . Take sample of the white solid for XRPD. The XRPD pattern of the obtained solid is shown in **FIG. 1**. It is Form Amorphous of compound (I).

Example 3: Alternative preparation of Compound 1 Type A

[00388] About 20 mg of freeform amorphous of compound 1 was weighed into a 20-mL glass vial and dissolved with ACN to obtain a clear solution (filter the suspension by 0.45 μ m PTFE membrane). The

solution was magnetically stirred with addition of water till precipitates appeared. The obtained precipitates were isolated for XRPD analysis. The XRPD pattern was same as that in **FIG. 2** and confirmed to be Compound 1 Type A.

Example 4: Preparation of Compound 1 Freeform Type B

[00389] Compound 1 Freeform Type B was obtained by slurry Freeform Compound 1 Type A (50 mg) in MeOH (0.5 mL) at room temperature (RT) for 6 days. Solids were isolated by centrifugation and RT air dried, before characterization. Samples are taken for XRPD, DSC, TGA, ¹H-NMR, and DVS analysis.

[00390] The XRPD pattern was shown in **FIG. 5**. Major peaks and their related intensities in the XRPD pattern are shown in Table 2. The TGA curve in **FIG. 7** showed a weight loss of 1.29% up to 150 °C. The DSC curve in **FIG. 6** showed one endotherm at 173.1 °C (peak temperature). ¹H NMR spectrum showed no obvious residual organic solvents. Based on limited TGA weight loss and neat DSC, freeform Type B was speculated to be anhydrate. DVS plot in **FIG. 8** showed that 0.0679% water uptake was detected at 80% relative humidity (RH)/25 °C in the sorption curve from 0%RH to 95%RH, indicating that freeform Compound 1 Freeform Type B was non-hygroscopic.

Example 5: Preparation of Compound 1 Type C

[00391] About 20 mg of freeform amorphous of compound 1 was weighed into a 20-mL glass vial and dissolved with 1,4-dioxane to obtain a clear solution (filter the suspension by 0.45 µm PTFE membrane). The solution was magnetically stirred with addition of water till precipitates appeared. The obtained precipitates were isolated for XRPD, DSC, TGA, and ¹H NMR analysis.

[00392] The XRPD pattern of the obtained solid is shown in **FIG. 9**. Major peaks and their related intensities in the XRPD pattern are shown in Table 3. DSC and TGA results are shown in **FIG. 10** and **FIG. 11**.

Example 6: Preparation of Compound 1 Type D

[00393] About 20 mg of freeform amorphous of compound 1 was weighed into a 20-mL glass vial and dissolved with 2-MeTHF to obtain a clear solution (filter the suspension by 0.45 µm PTFE membrane). The solution was magnetically stirred with addition of n-Heptane till precipitates appeared. The obtained precipitates were isolated for XRPD, DSC, TGA, and ¹H NMR analysis.

[00394] The XRPD pattern of the obtained solid is shown in **FIG. 12**. Major peaks and their related intensities in the XRPD pattern are shown in Table 4. DSC and TGA results are shown in **FIG. 13** and **FIG. 14**.

Example 7: Preparation of Compound 1 Type E

[00395] About 20 mg of freeform Compound 1 Type A was dissolved in 0.5 mL toluene in an HPLC vial at 50 °C. After cooled back to RT and evaporated at RT, precipitation appeared. The obtained solids were isolated by centrifugation and air dried at RT for XRPD, DSC, TGA, and ¹H-NMR analysis.

[00396] The XRPD pattern was shown in FIG. 15. Major peaks and their related intensities in the XRPD pattern are shown in Table 5. The TGA curve in FIG. 16 showed a weight loss of 16.63 % up to 150 °C. The DSC curve in FIG. 17 showed three endotherms at 101.0, 109.6 and 173.4 °C and one exotherm at 104.0 °C (peak temperature).

Example 8: Preparation of Compound 1 Type F

[00397] About 20 mg of freeform Compound 1 Type A was suspended in 0.5 mL MEK. The suspension was stirred and subjected to temperature cycling for 4 days. The temperature range was between 50 °C and 5 °C. The temperature was firstly heating to 50 °C at a rate of 4.5 °C/min, followed by equilibration for 2 hours, then cooled down to 5 °C at a rate of 0.1 °C/min, and kept isothermal at 5 °C for 2 hours. The last step was cooled down to 5 °C at a rate of 0.1 °C/min and kept isothermal at 5 °C. The obtained solids were isolated and air dried for XRPD, DSC, TGA, and ¹H NMR analysis.

[00398] The XRPD pattern of the obtained solid is shown in FIG. 18. Major peaks and their related intensities in the XRPD pattern are shown in Table 6. DSC and TGA results are shown in FIG. 19 and FIG. 20.

Example 9: Preparation of Compound 1 Sodium Salt Type A

[00399] Sodium salt Type A was obtained by 1-day -20 °C slurry of freeform Type B and NaOH (1 eq.) in acetone/H₂O, (19:1, v:v). Solids were isolated by centrifugation and RT vacuum dried before characterization.

[00400] The XRPD pattern of the obtained solid is shown in FIG. 21. Major peaks and their related intensities in the XRPD pattern are shown in Table 7. DSC and TGA results are shown in FIG. 22 and FIG. 23.

Example 10: Preparation of Compound 1 Sodium Salt Type B

[00401] Sodium salt Type B was obtained by 3-day RT slurry of freeform Type B and NaOH (1 eq.) in EtOAc. The XRPD overlay showed the peaks of freeform Type B was observed.

[00402] The XRPD pattern of the obtained solid is shown in FIG. 24. Major peaks and their related intensities in the XRPD pattern are shown in Table 8.

Example 11: Preparation of Compound 1 Sodium Salt Type C

[00403] Sodium salt Type C was obtained via slurry sodium salt Type B and freeform and NaOH (~1 eq.) in EtOAc at RT for 2 days. Solids were isolated by centrifugation and RT vacuum dried before characterization.

[00404] The XRPD pattern of the obtained solid is shown in **FIG. 25**. Major peaks and their related intensities in the XRPD pattern are shown in Table 9. DSC and TGA results are shown in **FIG. 26** and **FIG. 27**.

Example 12: Preparation of Compound 1 Sodium Salt Type D

[00405] Sodium salt Type D was obtained by RT slurry of freeform Type B and NaOH (2 eq.) in IPA. Solids were isolated by centrifugation and RT vacuum dried before characterization.

[00406] The XRPD pattern of the obtained solid is shown in **FIG. 28**. Major peaks and their related intensities in the XRPD pattern are shown in Table 10. DSC and TGA results are shown in **FIG. 29** and **FIG. 30**.

Example 13: Preparation of Compound 1 Potassium Salt Type A

[00407] Potassium salt Type A was obtained by 3-day RT slurry of freeform Type B and KOH (1 eq.) in acetone/H₂O, (19:1, v:v). Solids were isolated by centrifugation and RT vacuum dried before characterization.

[00408] The XRPD pattern of the obtained solid is shown in **FIG. 31**. Major peaks and their related intensities in the XRPD pattern are shown in Table 11. DSC and TGA results are shown in **FIG. 32** and **FIG. 33**.

Example 14: Preparation of Compound 1 Ammonium Salt Type A

[00409] Ammonium salt Type A was obtained by 3-day RT slurry of freeform Type B and ammonia (1 eq.) in acetone/H₂O, (19:1, v:v). Solids were isolated by centrifugation and RT vacuum dried before characterization.

[00410] The XRPD pattern of the obtained solid is shown in **FIG. 34**. Major peaks and their related intensities in the XRPD pattern are shown in Table 12. DSC and TGA results are shown in **FIG. 35** and **FIG. 36**.

Example 15: Preparation of Compound 1 Ammonium Salt Type B

[00411] Ammonium salt Type B was obtained from 3-day RT slurry of freeform Type B and ammonia (1 eq.) in EtOAc. Solids were isolated by centrifugation and RT vacuum dried before characterization.

[00412] The XRPD pattern of the obtained solid is shown in **FIG. 37**. Major peaks and their related intensities in the XRPD pattern are shown in Table 13. DSC and TGA results are shown in **FIG. 38** and **FIG. 39**.

Example 16: Preparation of Compound 1 Ammonium Salt Type C

[00413] Ammonium salt Type C was obtained from 3-day RT slurry of freeform Type B and ammonia (1 eq.) in IPA. Solids were isolated by centrifugation and RT vacuum dried before characterization.

[00414] The XRPD pattern of the obtained solid is shown in **FIG. 40**. Major peaks and their related intensities in the XRPD pattern are shown in Table 14. DSC and TGA results are shown in **FIG. 41** and **FIG. 42**.

Example 17: Preparation of Compound 1 L-Arginine Salt Type A

[00415] L-Arginine salt Type A was obtained from 3-day RT slurry of freeform Type B and arginine (1 eq.) in acetone/H₂O, (19:1, v:v). Solids were isolated by centrifugation and RT vacuum dried before characterization.

[00416] The XRPD pattern of the obtained solid is shown in **FIG. 43**. Major peaks and their related intensities in the XRPD pattern are shown in Table 15. DSC and TGA results are shown in **FIG. 44** and **FIG. 45**.

Example 18: Preparation of Compound 1 Choline Salt Type A

[00417] Choline salt Type A was obtained from RT slurry of freeform Type B and choline (2 eq.) in IPA. Solids were isolated by centrifugation and RT vacuum dried before characterization.

[00418] The XRPD pattern of the obtained solid is shown in **FIG. 46**. Major peaks and their related intensities in the XRPD pattern are shown in Table 16. DSC and TGA results are shown in **FIG. 47** and **FIG. 48**.

Abbreviation for solvents 1

Abbreviation	Solvent	Abbreviation	Solvent
MeOH	Methanol	THF	Tetrahydrofuran
EtOH	Ethanol	2-MeTHF	2-methyltetrahydrofuran
MIBK	Methyl isobutyl ketone	ACN	Acetonitrile
EtOAc	Ethyl acetate	H ₂ O	Water
IPAc	Isopropyl acetate	DCM	Dichloromethane
MTBE	Methyl tert-butyl ether	CHCl ₃	Trichloromethane
DMAc	N,N-dimethylacetamide	DMSO	Dimethylsulfoxide
NMP	N-Methyl-2-pyrrolidone	MEK	Methyl ethyl ketone
CPME	Cyclopentyl methyl ether	BuOAc	n-Butyl acetate
IPA	Isopropyl alcohol	BuOH	Butyl alcohol
DMF	Dimethyl Formamide	--	--

Analytical methods for free form

Thermal Gravimetric Analysis (TGA) and Differential Scanning Calorimetry (DSC)

[00419] TGA data was collected using a Discovery TGA 5500 from TA Instruments. DSC was performed using a Discovery DSC 2500 from TA Instruments. Detailed parameters used are listed below.

Parameters	TGA	DSC
Method	Ramp	Ramp
Sample pan	Aluminum, open	Aluminum, crimped
Temperature	RT - desired temperature	25 °C - desired temperature
Heating rate	10 °C/min	10 °C/min
Purge gas	N ₂	N ₂

X-ray Powder Diffractometer (XRPD)

[00420] For XRPD analysis, a PANalytical Empyrean and X' Pert3 X-ray powder diffract meter was used. The XRPD parameters used are listed below.

Parameters	XRPD		
Model	Empyrean	X' Pert ³	Empyrean (VT-XRPD)
Test mode	Reflection	Reflection	Reflection
X-Ray wavelength	Cu, α , K α 1 (Å): 1.540598, K α 2 (Å): 1.544426 K α 2/K α 1 intensity ratio: 0.50	Cu, α , K α 1 (Å): 1.540598, K α 2 (Å): 1.544426 K α 2/K α 1 intensity ratio: 0.50	Cu, α , K α 1 (Å): 1.540598, K α 2 (Å): 1.544426 K α 2/K α 1 intensity ratio: 0.50
X-Ray tube setting	45 kV, 40 mA	45 kV, 40 mA	45 kV, 40 mA
Divergence slit	1/8°	1/8°	1/8°
Scan mode	Continuous	Continuous	Continuous
Scan range (2 θ)	3-40	3-40	3-40
Scan step time (s)	46.7	46.7	33.0
Step size (2 θ)	0.0263	0.0263	0.0167
Test Time (s)	5 min 30 s	5 min 04 s	~10 min 17 s

Dynamic Vapor Sorption (DVS)

[00421] DVS was measured via a SMS (Surface Measurement Systems) DVS Intrinsic. The relative humidity at 25 °C were calibrated against deliquescence point of LiCl, Mg(NO₃)₂ and KCl. Parameters for DVS test are listed below.

Item	Value
Temperature	25 °C
Sample size	10 ~ 20 mg
Gas and flow rate	N ₂ , 200 mL/min
dm/dt	0.002%/min
Min. dm/dt stability duration	10 min
Max. equilibrium time	180 min
RH range	0%RH-95%RH-0%RH
RH step size	10% (70% RH-0% RH-90% RH) 5% (95% RH-90% RH and 90% RH-95% RH)

¹H-NMR

[00422] Solution NMR was collected on Bruker 400M NMR Spectrometer using DMSO-d₆ as the solvent. Detailed parameters used were listed below.

Parameters	NMR Spectrometer
Number of Scans	16
Spectrometer Frequency	400M
Solvent	DMSO
Temperature	295.6 K

High Performance Liquid Chromatography (HPLC)

[00423] Agilent 1260 with VWD detector was utilized and detailed chromatographic condition was listed below.

Parameters	Agilent 1260 with VWD detector	
Column	Xbridge C18, 150×4.6 mm, 5 μm	
Mobile phase	A: 0.03% TFA in H ₂ O	
	B: 0.03% TFA in acetonitrile	
Gradient table	Time (min)	%B
	0.0	40
	13.0	95
	16.0	95
	16.0	40
	19.0	40
Run time	19.0 min	
Post time	0.0 min	
Flow rate	1.0 mL/min	

Parameters	Agilent 1260 with VWD detector
Injection volume	5 μL
Detector wavelength	UV at 242 nm
Column temperature	40 $^{\circ}\text{C}$
Sampler temperature	RT
Diluent	ACN:H ₂ O, (1:1, v:v)

Analytical methods for salts

Differential Scanning Calorimetry (DSC) and Thermal Gravimetric Analysis (TGA)

[00424] TGA data was collected using a Discovery TGA 5500 from TA Instruments. DSC was performed using a Discovery DSC 2500 from TA Instruments. Detailed parameters used are listed below.

Parameters	TGA	DSC
Method	Ramp	Ramp
Sample pan	Aluminum, open	Aluminum, crimped
Temperature	RT - desired temperature	25 $^{\circ}\text{C}$ - desired temperature
Heating rate	10 $^{\circ}\text{C}/\text{min}$	10 $^{\circ}\text{C}/\text{min}$
Purge gas	N ₂	N ₂

X-ray Powder Diffractometer (XRPD)

[00425] For XRPD analysis, a PANalytical Empyrean and X' Pert³ X-ray powder diffract meter was used. The XRPD parameters used are listed below.

Parameters	XRPD		
Model	Empyrean	X' Pert ³	Empyrean (VT-XRPD)
Test mode	Reflection	Reflection	Reflection
X-Ray wavelength	Cu, $\text{K}\alpha$, $\text{K}\alpha 1$ ($\text{\AA}$): 1.540598, $\text{K}\alpha 2$ ($\text{\AA}$): 1.544426 $\text{K}\alpha 2/\text{K}\alpha 1$ intensity ratio: 0.50	Cu, $\text{K}\alpha$, $\text{K}\alpha 1$ ($\text{\AA}$): 1.540598, $\text{K}\alpha 2$ ($\text{\AA}$): 1.544426 $\text{K}\alpha 2/\text{K}\alpha 1$ intensity ratio: 0.50	Cu, $\text{K}\alpha$, $\text{K}\alpha 1$ ($\text{\AA}$): 1.540598, $\text{K}\alpha 2$ ($\text{\AA}$): 1.544426 $\text{K}\alpha 2/\text{K}\alpha 1$ intensity ratio: 0.50
X-Ray tube setting	45 kV, 40 mA	45 kV, 40 mA	45 kV, 40 mA
Divergence slit	$1/8^{\circ}$	$1/8^{\circ}$	$1/8^{\circ}$
Scan mode	Continuous	Continuous	Continuous
Scan range (2θ)	3-40	3-40	3-40
Scan step time (s)	46.7	46.7	33.0
Step size (2θ)	0.0263	0.0263	0.0167

Parameters	XRPD		
Test Time (s)	5 min 30 s	5 min 04 s	~10 min 17 s

Dynamic Vapor Sorption (DVS)

[00426] Dynamic vapor sorption was performed with an ADVENTURE series DVS at 25 °C under nitrogen blow. Approximately 30 milligrams of material was used. Samples were analyzed using methods below:

0% RH to 95% RH at 10% RH (5% from 90 to 95%RH)

95% RH to 0% RH at 10% RH (5% from 95 to 90%RH)

¹H-NMR

[00427] ¹H NMR data was taken using Bruker 400M in DMSO-d₆ solvent.

High Performance Liquid Chromatography (HPLC)

[00428] Agilent 1260 with VWD detector was utilized and detailed chromatographic condition are listed below.

Parameters	Agilent 1260 with VWD detector	
Column	Xbridge C18, 150×4.6 mm, 5 μm	
Mobile phase	A: 0.03% TFA in H ₂ O	
	B: 0.03% TFA in acetonitrile	
Gradient table	Time (min)	%B
	0.0	40
	13.0	95
	16.0	95
	16.0	40
	19.0	40
Run time	19.0 min	
Post time	0.0 min	
Flow rate	1.0 mL/min	
Injection volume	5 μL	
Detector wavelength	UV at 242 nm	
Column temperature	40 °C	
Sampler temperature	RT	
Diluent	ACN:H ₂ O, (1:1, v:v)	

IC Analysis

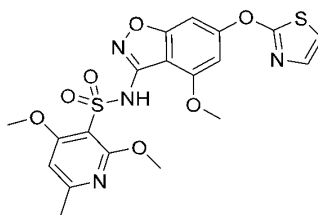
[00429] Thermo Scientific™ Dionex™ Aquion™ Ion Chromatography (IC) System 1100 with conductivity detector was utilized and detailed chromatographic condition are listed below.

IC	ThermoFisher ICS-1100
Column	Dionex IonPac™ CS12A RFIC™ 4×250mm Analytical
Mobile phase	20 mM Methanesulfonic acid
Injection volume	25 µL
Flow rate	1.0 mL/min
Cell Temp.	35 °C
Column Temp.	35 °C
Current	80 mA
Run Time	7 min (Na ⁺ , K ⁺ , NH ₄ ⁺)

CLAIMS

WHAT IS CLAIMED IS:

1. A solid state form of 2,4-dimethoxy-N-(4-methoxy-6-(thiazol-2-yloxy)benzo[d]isoxazol-3-yl)-6-



methylpyridine-3-sulfonamide:

(Compound 1) or a

pharmaceutically acceptable salt thereof.

2. The solid state form of claim 1, wherein the solid state form is a crystalline form.
3. The solid state form of claim 1 or 2, wherein the solid state form is crystalline Compound 1 freeform Type A, crystalline Compound 1 freeform Type C, crystalline Compound 1 freeform Type D, crystalline Compound 1 freeform Type E, or crystalline Compound 1 freeform Type F.
4. The solid state form of claim 1 or 2, wherein the solid state form is crystalline Compound 1 freeform Type B.
5. The solid state form of claim 1 or 2, wherein the solid state form is in the form of a salt.
6. The solid state form of claim 1 or 2, wherein the solid state form is in the form of a sodium, potassium, ammonium, or choline salt.
7. The solid state form of claim 1 or 2, wherein the solid state form is in the form of an L-arginine salt.
8. The crystalline form of claim 2, wherein the crystalline form is Compound 1 freeform Type B characterized as having at least one of the following properties:
 - (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 5** as measured using Cu K α radiation;
 - (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $12.8 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, and $24.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
 - (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 6**;
 - (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 7**; or
 - (e) combinations thereof.
9. The crystalline form of claim 8, wherein the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 5** as measured using Cu K α radiation.
10. The crystalline form of claim 8 or 9, wherein the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 2 as measured using Cu K α radiation.
11. The crystalline form of any one of claims 8-10, wherein the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $12.8 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, and $24.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

12. The crystalline form of any one of claims 8-11, wherein the X-ray powder diffraction (XRPD) pattern further comprises peaks at $12.0 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, and $22.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.
13. The crystalline form of any one of claims 8-12, wherein the X-ray powder diffraction (XRPD) pattern further comprises peaks at $5.4 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.
14. The crystalline form of any one of claims 8-13, wherein the X-ray powder diffraction (XRPD) pattern further comprises peaks at $22.1 \pm 0.2^\circ 2\theta$ and $25.1 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.
15. The crystalline form of any one of claims 8-10, wherein the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $5.4 \pm 0.2^\circ 2\theta$, $12.0 \pm 0.2^\circ 2\theta$, $12.8 \pm 0.2^\circ 2\theta$, $14.5 \pm 0.2^\circ 2\theta$, $21.6 \pm 0.2^\circ 2\theta$, $22.1 \pm 0.2^\circ 2\theta$, $22.7 \pm 0.2^\circ 2\theta$, $23.0 \pm 0.2^\circ 2\theta$, $24.7 \pm 0.2^\circ 2\theta$, $25.1 \pm 0.2^\circ 2\theta$, and $27.0 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.
16. The crystalline form of any one of claims 8-15, wherein the crystalline form is non hygroscopic.
17. The crystalline form of any one of claims 8-16, wherein the crystalline form is an anhydrate.
18. The crystalline form of any one of claims 8-17, wherein 0.0679% water uptake was detected at 80% relative humidity (RH)/25 °C in the sorption curve from 0%RH to 95%RH.
19. The crystalline form of claim 2, wherein the crystalline form is Compound 1 L-Arginine Salt Type A characterized as having at least one of the following properties:
 - (a) an X-Ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 43** as measured using Cu K α radiation;
 - (b) an X-Ray powder diffraction (XRPD) pattern with peaks at $11.0 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, and $18.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation;
 - (c) a Differential Scanning Calorimetry (DSC) thermogram substantially the same as shown in **FIG. 44**;
 - (d) a Thermogravimetric Thermal Analysis (TGA) thermogram substantially the same as shown in **FIG. 45**; or
 - (e) combinations thereof.
20. The crystalline form of claim 19, wherein the crystalline form has an X-ray powder diffraction (XRPD) pattern substantially the same as shown in **FIG. 43** as measured using Cu K α radiation.
21. The crystalline form of claim 19 or 20, wherein the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks found in Table 15 as measured using Cu K α radiation.
22. The crystalline form of any one of claims 19-21, wherein the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $11.0 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, and $18.6 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.
23. The crystalline form of any one of claims 19-22, wherein the X-ray powder diffraction (XRPD) pattern further comprises peaks at $6.1 \pm 0.2^\circ 2\theta$, $12.6 \pm 0.2^\circ 2\theta$, and $15.3 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.

24. The crystalline form of any one of claims 19-23, wherein the X-ray powder diffraction (XRPD) pattern further comprises peaks at $19.6 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.
25. The crystalline form of any one of claims 19-21, wherein the crystalline form has an X-ray powder diffraction (XRPD) pattern with peaks at $6.1 \pm 0.2^\circ 2\theta$, $11.0 \pm 0.2^\circ 2\theta$, $12.6 \pm 0.2^\circ 2\theta$, $13.7 \pm 0.2^\circ 2\theta$, $15.3 \pm 0.2^\circ 2\theta$, $18.6 \pm 0.2^\circ 2\theta$, $19.6 \pm 0.2^\circ 2\theta$, $20.5 \pm 0.2^\circ 2\theta$, and $21.7 \pm 0.2^\circ 2\theta$ as measured using Cu K α radiation.
26. A pharmaceutical composition comprising a crystalline form of any one of claims 2-25, or a pharmaceutically acceptable salt thereof, and at least one pharmaceutically acceptable excipient.
27. A method of inhibiting a Lysine Acetyltransferase 6A (KAT6A) in a subject in need thereof, comprising administering to the subject a crystalline form of any one of claims 2-25, or a pharmaceutically acceptable salt thereof, or a pharmaceutical composition of claim 26.
28. A method of modulating Lysine Acetyltransferase 6A (KAT6A) activity in a subject in need thereof, comprising administering to the subject a crystalline form of any one of claims 2-25, or a pharmaceutically acceptable salt thereof, or a pharmaceutical composition of claim 26.
29. The method of claim 27 or 28, wherein the subject has cancer.
30. A method of treating cancer in a mammal in need thereof, comprising administering to the mammal a crystalline form of any one of claims 2-25, or a pharmaceutically acceptable salt thereof.
31. A method of treating cancer in a mammal in need thereof, comprising administering to the mammal a pharmaceutical composition of claim 26.
32. The method of any one of claims 29-31, wherein the cancer is selected from lung cancer, mesothelioma, bone cancer, pancreatic cancer, skin cancer, cancer of the head or neck, cutaneous or intraocular melanoma, uterine cancer, ovarian cancer, rectal cancer, stomach cancer, hepatocellular carcinoma, colon cancer, breast cancer, carcinoma of the endometrium, carcinoma of the cervix, carcinoma of the vagina, Hodgkin's disease, cancer of the esophagus, cancer of the small intestine, cancer of the endocrine system, cancer of the thyroid gland, cancer of the parathyroid gland, cancer of the adrenal gland, sarcoma of soft tissue, cancer of the urethra, cancer of the penis, prostate cancer, hematology malignancy, chronic or acute leukemia, lymphocytic lymphomas, cancer of the bladder, cancer of the kidney or ureter, renal cell carcinoma, carcinoma of the renal pelvis, neoplasms of the central nervous system (CNS), primary CNS lymphoma, spinal axis tumors, glioblastoma, brain stem glioma, pituitary adenoma, or a combination of two or more of the foregoing cancers.
33. The method of any one of claims 29-31, wherein the cancer is selected from ER-positive breast cancer, glioblastoma, non-small cell lung cancer (NSCLC), small cell lung cancer (SCLC), melanoma, ovarian cancer, prostate cancer, pancreatic cancer, colorectal cancer (CRC), hepatocellular carcinoma (HCC), renal cell carcinoma (RCC), leukemia, lymphoma or multiple

- myeloma, acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL), chronic myeloid leukemia (CML), and non-Hodgkin's lymphoma.
34. The method of any one of claims 29-31, wherein the cancer is a solid tumor with KAT6A/6B amplification or overexpression, or leukemia or solid tumor with KAT6A/6B fusion protein resulting from chromosomal translocation.