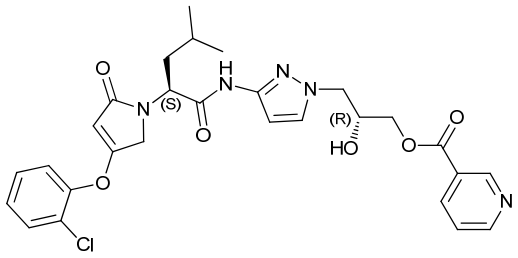
CLAIMS

1. A crystal form A of a compound of formula (A):



(A)

which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including at least the characteristic peaks represented by the following º2θ: 8.5±0.2, 17.7±0.2, 18.0±0.2, and 18.6±0.2;

optionally, wherein the crystal form has one or more of the following definitions:

i) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 10.1±0.2, 14.5±0.2, 20.2±0.2, 20.6±0.2, 25.1±0.2, and 25.7±0.2; and/or

ii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 12.9±0.2, 15.2±0.2, 22.0±0.2, 23.2±0.2, and 23.9±0.2; and/or

iii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 11.2±0.2, 12.1±0.2, 14.2±0.2, 15.7±0.2, 19.6±0.2, 21.2±0.2, 28.6±0.2, and 30.0±0.2; or

iv) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including the following characteristic peaks:

Angle º2θ±0.2 º2θ	Relative intensity %
8.54	97.6
10.05	36.1
11.23	13.8
12.10	20.5
12.91	25.9
14.19	28.0
14.48	36.3
15.25	21.7
15.67	7.4

17.72	97.9
18.02	100.0
18.55	78.1
19.55	12.9
20.17	37.3
20.60	45.3
21.24	5.8
22.01	25.1
23.16	19.0
23.94	21.6
25.09	30.8
25.74	33.7
28.62	9.2
29.98	6.6

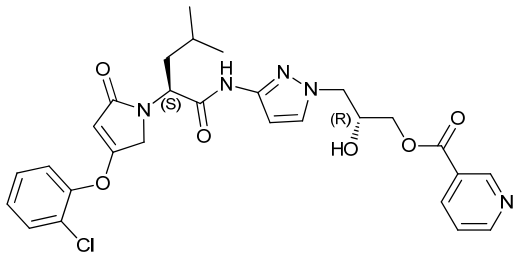
; or

v) characterized in that it has an X-ray powder diffraction pattern substantially as shown in Fig. 7; and/or

vi) characterized in that it has an endothermic peak at 135.5±2 ºC in differential scanning calorimetry analysis; and/or

vii) characterized in that it has a weight loss of 1.36±0.5% at 150 ºC in thermogravimetric analysis.

2. Crystal form A of a hydrochloride of a compound of formula (A):



(A)

which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including at least the characteristic peaks represented by the following º2θ: 4.1±0.2, 15.3±0.2, and 18.5±0.2;

optionally, wherein the crystal form has one or more of the following definitions:

i) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 8.1±0.2, 10.6±0.2, 11.9±0.2, 22.1±0.2, and 22.9±0.2; and/or

ii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation

further including the characteristic peaks represented by the following º2θ: 12.2±0.2, 17.9±0.2, 21.5±0.2, and 24.9±0.2; or

iii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including the following characteristic peaks:

Angle º2θ±0.2 º2θ	Relative intensity %
4.06	86.1
8.11	30.3
10.61	36.7
11.89	39.2
12.18	23.0
15.27	66.8
15.66	19.5
16.28	12.1
16.68	20.0
17.89	29.9
18.45	100.0
19.45	12.6
20.41	15.7
21.51	23.7
22.14	32.6
22.94	32.0
23.75	5.8
24.94	26.0
26.89	21.1
27.53	11.9
28.23	9.8
30.64	6.5

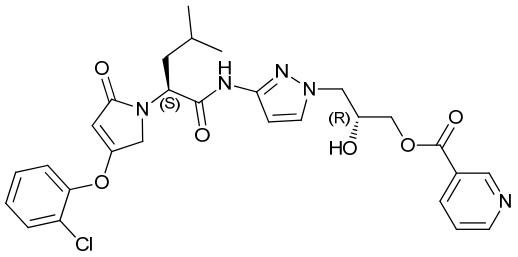
; or

iv) characterized in that it has an X-ray powder diffraction pattern substantially as shown in Fig. 9; and/or

v) characterized in that it has endothermic peaks at 125.9±2 ºC and 177.8±2 ºC in differential scanning calorimetry analysis; and/or

vi) characterized in that it has a weight loss of 4.91±0.5% at 150 ºC in thermogravimetric analysis.

3. Crystal form B of a hydrochloride of a compound of formula (A):



(A)

which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including at least the characteristic peaks represented by the following º2θ: 4.5±0.2, 18.1±0.2, and 21.4±0.2;

optionally, wherein the crystal form has one or more of the following definitions:

i) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 11.1±0.2 and 21.7±0.2; and/or

ii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 8.7±0.2, 13.7±0.2, 14.4±0.2, 15.1±0.2, and 23.2±0.2; or

iii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including the following characteristic peaks:

Angle º2θ±0.2 º2θ	Relative intensity %
4.46	66.9
8.73	26.1
11.09	38.6
13.66	21.8
14.35	27.7
15.07	28.4
16.46	19.0
17.44	18.9
18.13	70.4
18.83	17.6
21.35	100.0
21.67	44.8
22.19	14.1
23.17	21.4
24.36	13.4
25.43	7.4
25.96	14.7
26.78	13.9

27.47	11.4
28.37	10.4
29.50	6.5
30.36	5.8
31.35	8.7
32.34	7.2
34.95	6.7

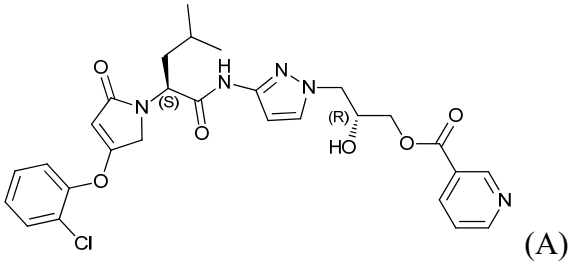
; or

iv) characterized in that it has an X-ray powder diffraction pattern substantially as shown in Fig. 22; and/or

v) characterized in that it has endothermic peaks at 123.1±2 ºC, 135.2±2 ºC, and 187.5±2 ºC in differential scanning calorimetry analysis; and/or

vi) characterized in that it has a weight loss of 1.32±0.5% at 70 ºC, and a weight loss of 5.32±0.5% at 70 to 150 ºC in thermogravimetric analysis.

4. Crystal form C of a hydrochloride of a compound of formula (A):



(A)

which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including at least the characteristic peaks represented by the following º2θ: 8.2±0.2, 10.6±0.2, 13.4±0.2, and 20.2±0.2;

optionally, wherein the crystal form has one or more of the following definitions:

i) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 16.8±0.2 and 17.7±0.2; and/or

ii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 4.1±0.2, 8.8±0.2, and 12.2±0.2; or

iii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα

radiation including the following characteristic peaks:

Angle º2θ±0.2 º2θ	Relative intensity %
4.11	24.8
8.16	78.6
8.78	28.8
10.61	100.0
12.24	32.4
12.52	17.6
13.41	71.0
15.05	16.2
16.78	48.8
17.72	57.7
19.06	8.8
20.22	60.2
21.52	18.1
24.64	19.7
26.66	20.6
27.73	21.7

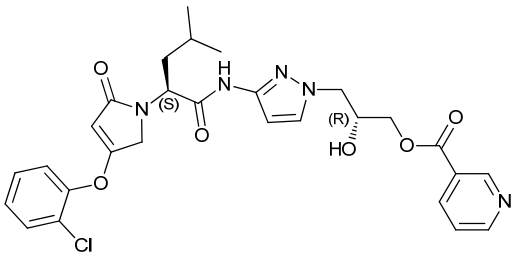
; or

iv) characterized in that it has an X-ray powder diffraction pattern substantially as shown in Fig. 24; and/or

v) characterized in that it has endothermic peaks at 60.7±2 ºC, 114.4±2 ºC, and 182.4±2 ºC in differential scanning calorimetry analysis; and/or

vi) characterized in that it has a weight loss of 5.53±0.5% at 80 ºC, and a weight loss of 6.72±0.5% at 80 to 150 ºC in thermogravimetric analysis.

5. Crystal form A of a maleate of a compound of formula (A):



(A)

which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including at least the characteristic peaks represented by the following º2θ: 6.0±0.2 and 18.4±0.2;

optionally, wherein the crystal form has one or more of the following definitions:

i) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following °2θ: 10.4±0.2, 15.9±0.2, and 17.4±0.2; and/or

ii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following °2θ: 6.9±0.2, 12.0±0.2, 21.2±0.2, and 21.8±0.2; or

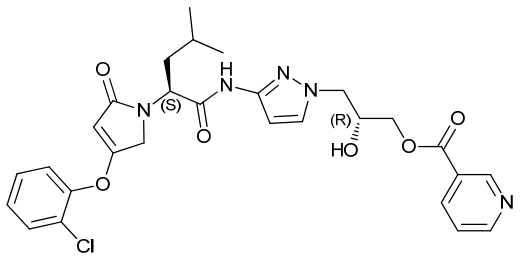
iii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including the following characteristic peaks:

Angle °2θ±0.2 °2θ	Relative intensity %
6.01	100.0
6.92	12.6
10.41	18.6
12.01	12.2
15.93	17.4
17.38	30.8
18.42	57.6
19.46	8.1
21.21	12.1
21.76	14.4
22.93	5.1

; or

iv) characterized in that it has an X-ray powder diffraction pattern substantially as shown in Fig. 11.

6. Crystal form B of a maleate of a compound of formula (A):



(A)

which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including at least the characteristic peaks represented by the following °2θ: 4.1±0.2, 8.1±0.2, 16.7±0.2, and 20.2±0.2;

optionally, wherein the crystal form has one or more of the following definitions:

i) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 17.5±0.2 and 21.3±0.2; and/or

ii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 16.2±0.2, 20.4±0.2, 22.4±0.2, 24.1±0.2, 24.6±0.2, and 26.5±0.2; or

iii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including the following characteristic peaks:

Angle º2θ±0.2 º2θ	Relative intensity%
4.08	79.3
8.13	94.1
10.50	21.5
12.20	27.7
13.31	13.4
15.01	21.4
16.24	31.0
16.68	72.3
17.54	60.1
18.37	12.5
20.17	100.0
20.41	34.0
21.34	67.4
22.40	34.6
22.69	26.7
23.16	13.7
24.14	49.6
24.56	30.9
25.97	21.7
26.55	34.4
27.59	20.4
29.90	15.4

; or

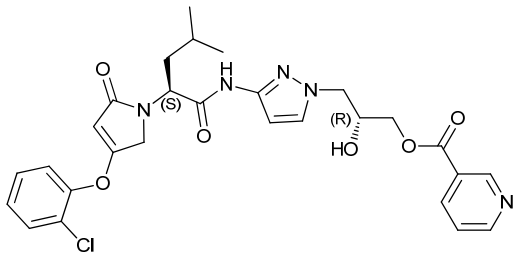
iv) characterized in that it has an X-ray powder diffraction pattern substantially as shown in Fig. 12; and/or

v) characterized in that it has an endothermic peak at 85.6±2 ºC in differential scanning calorimetry analysis; and/or

vi) characterized in that it has a weight loss of 12.02±0.5% at 120 ºC in thermogravimetric

analysis.

7. Crystal form A of a naphthalene disulfonate of a compound of formula (A):



(A)

which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including at least the characteristic peaks represented by the following º2θ: 4.0±0.2 and 13.7±0.2;

optionally, wherein the crystal form has one or more of the following definitions:

i) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 10.3 ±0.2, 15.5±0.2, 21.0±0.2, and 22.3±0.2; or

ii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including the following characteristic peaks:

Angle º2θ±0.2 º2θ	Relative intensity %
4.03	100.0
10.28	31.9
11.96	12.6
13.68	67.6
15.49	28.7
20.96	22.4
22.27	28.0
26.22	15.1

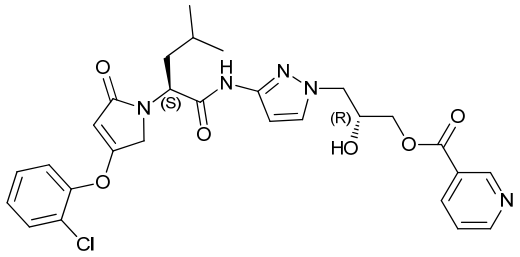
; or

iii) characterized in that it has an X-ray powder diffraction pattern substantially as shown in Fig. 14; and/or

iv) characterized in that it has endothermic peaks at 119.2±2 ºC and 207.9±2 ºC in differential scanning calorimetry analysis; and/or

v) characterized in that it has a weight loss of 5.97±0.5% at 150 ºC in thermogravimetric analysis.

8. Crystal form A of an oxalate of a compound of formula (A):



(A)

which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including at least the characteristic peaks represented by the following º2θ: 5.0±0.2 and 15.0±0.2;

optionally, wherein the crystal form has one or more of the following definitions:

i) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 7.4±0.2, 16.5±0.2, 19.3±0.2, 20.1±0.2, 25.2±0.2, and 26.0±0.2; or

ii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including the following characteristic peaks:

Angle º2θ±0.2 º2θ	Relative intensity %
5.00	100.0
7.37	35.6
15.05	60.5
16.52	41.7
17.39	12.7
18.63	8.7
19.31	27.4
20.10	28.4
20.68	13.3
22.72	14.7
25.21	25.8
26.02	21.2

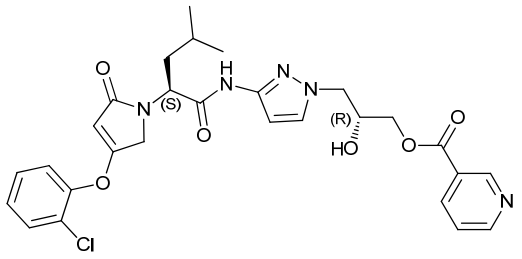
; or

iii) characterized in that it has an X-ray powder diffraction pattern substantially as shown in Fig. 16; and/or

iv) characterized in that it has endothermic peaks at 131.4±2 ºC and 192.8±2 ºC in differential scanning calorimetry analysis; and/or

v) characterized in that it has a weight loss of 3.91±0.5% at 150 ºC in thermogravimetric analysis.

9. Crystal form A of a hydrobromide of a compound of formula (A):



(A)

which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including at least the characteristic peaks represented by the following º2θ: 4.3±0.2 and 8.3±0.2;

optionally, wherein the crystal form has any one of the following definitions:

i) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 12.4±0.2, 17.5±0.2, 17.9±0.2, 20.5±0.2, and 21.3±0.2; or

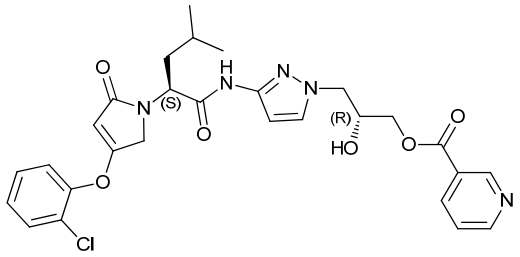
ii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including the following characteristic peaks:

Angle º2θ±0.2 º2θ	Relative intensity %
4.26	42.7
8.29	100.0
10.63	5.4
12.42	29.3
14.81	19.3
16.53	11.4
16.86	19.9
17.53	26.9
17.90	22.6
20.50	32.3
21.31	35.0
22.52	9.6
22.96	9.1
24.60	9.8
24.96	12.8

; or

iii) characterized in that it has an X-ray powder diffraction pattern substantially as shown in Fig. 18.

10. Crystal form B of a hydrobromide of a compound of formula (A):



(A)

which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including at least the characteristic peaks represented by the following º2θ: 4.1±0.2, 8.1±0.2, 15.0±0.2, 18.4±0.2, and 24.4±0.2;

optionally, wherein the crystal form has one or more of the following definitions:

i) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation further including the characteristic peaks represented by the following º2θ: 17.8±0.2, 20.3±0.2, 21.3±0.2, 22.0±0.2, and 22.8±0.2; or

ii) which is characterized by an X-ray powder diffraction pattern obtained using CuKα radiation including the following characteristic peaks:

Angle º2θ±0.2 º2θ	Relative intensity %
4.05	100.0
8.10	69.4
10.57	17.3
12.14	19.9
12.74	16.7
13.54	14.6
15.05	74.2
15.43	18.4
16.23	19.8
17.84	27.2
18.45	82.8
19.27	12.0
20.35	37.7
21.33	24.5
22.02	33.6
22.77	32.0
23.65	12.8
24.44	55.0
26.84	14.5
30.65	12.9

; or

iii) characterized in that it has an X-ray powder diffraction pattern substantially as shown in Fig. 19; and/or

iv) characterized in that it has endothermic peaks at 101.6±2 ºC and 113.3±2 ºC in differential scanning calorimetry analysis; and/or

v) characterized in that it has a weight loss of 4.59±0.5% at 90 ºC in thermogravimetric analysis.

11. A pharmaceutical composition, comprising the crystal form according to any one of claims 1 to 10 and one or more pharmaceutically acceptable excipients.

12. Use of the crystal form according to any one of claims 1 to 10 or the pharmaceutical composition according to claim 11 in the manufacture of a medicament for the treatment and/or prevention of one or more diseases selected from type I diabetes mellitus, type II diabetes mellitus, impaired glucose tolerance, impaired fasting blood glucose, hyperglycemia, postprandial hyperglycemia, overweight, obesity, hypertension, insulin resistance, and metabolic syndrome.

13. The crystal form according to any one of claims 1 to 10 or the pharmaceutical composition according to claim 11, for use in therapy..

14. Use of the crystal form according to any one of claims 1 to 10 or the pharmaceutical composition according to claim 11 in the manufacture of a medicament for curing diabetes, causing diabetes remission and/or regressing diabetes.