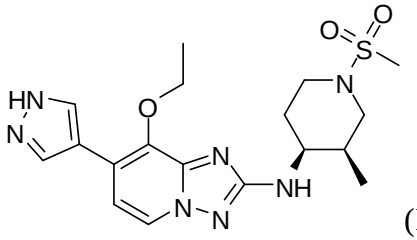
What is claimed is:

1. A solid form of a compound of Formula (I):



(I),

which is Form I, which is crystalline.

2. The solid form of claim 1, wherein:

(a) the form has at least four XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 7.3, 10.5, 12.8, 14.5, 15.2, 16.4, 20.3, 21.3, 21.6, and 27.0;

(b) the form has at least four XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 7.5, 13.0, 14.7, 15.3, 16.2, 16.6, 20.5, 20.8, 21.4, 23.3, 24.0, and 27.1;

(c) the form has at least ten XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 7.3, 10.5, 12.8, 14.5, 15.2, 16.4, 20.3, 21.3, 21.6, and 27.0; or

(d) the form has at least ten XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 7.5, 13.0, 14.7, 15.3, 16.2, 16.6, 20.5, 20.8, 21.4, 23.3, 24.0, and 27.1.

2. The solid form of claim 1, wherein:

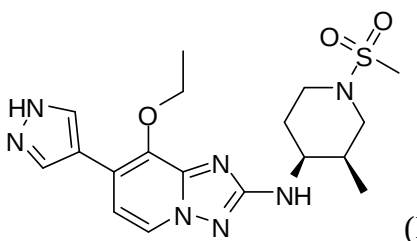
(a) the form has an XRPD pattern as substantially shown in FIG. 1;

(b) the form has a DSC thermogram substantially as shown in FIG. 2; or

(c) the form has a TGA thermogram substantially as shown in FIG. 3.

3. The solid form of claim 1 or 2, having an endothermic peak with an onset temperature (± 3ºC) at 191.7ºC and a maximum at 193.6ºC.

4. A solid form of a compound of Formula (I):



(I),

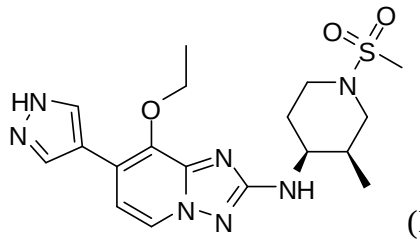
which is Form II, which is crystalline.

5. The solid form of claim 4, wherein the form has at least four XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 5.8, 7.6, 11.4, 12.5, 14.4, 17.2, 17.9, and 25.3.

6. The solid form of claim 4, wherein the form has an XRPD pattern as substantially shown in FIG. 22.

7. The solid form of any one of claims 4-6, having an endothermic peak with an onset temperature (± 3ºC) at 191.0ºC and a maximum at 193.4ºC.

8. A solid form of a compound of Formula (I):



(I),

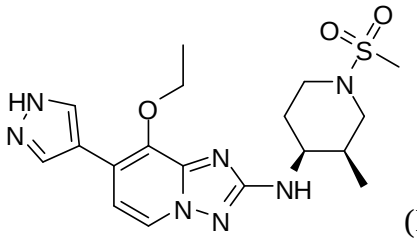
which is Form III, which is crystalline.

9. The solid form of claim 8, wherein the form has at least four XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 5.5, 9.8, 10.5, 12.1, 13.9, 16.3, 19.8, 22.0, 24.4, and 27.3.

10. The solid form of claim 8, wherein the form has an XRPD pattern as substantially shown in FIG. 25.

11. The solid form of any one of claims 8-10, having an endothermic peak with an onset temperature (± 3ºC) at 192.6ºC and a maximum at 194.3ºC.

12. A salt of a compound of Formula (I):


(I),

which is selected from:

a mono-maleate salt of the compound of Formula (I);

a di-besylate salt of the compound of Formula (I);

a mono-mesylate salt of the compound of Formula (I);

a di-tosylate salt of the compound of Formula (I);

a mono-hydrochloride salt of the compound of Formula (I); and

a di-hydrochloride salt of the compound of Formula (I).

13. The salt of claim 12, which is a mono-maleate salt of the compound of Formula (I), which is crystalline.

14. The salt of claim 13, wherein:

(a) the salt has at least four XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 10.4, 11.6, 12.0, 14.1, 15.1, 17.2, 18.1, 19.1, 21.3, 21.9, 22.9, 24.2, and 25.9; or

(b) the salt has an endothermic peak with an onset temperature (± 3ºC) at 180.4ºC and a maximum temperature (± 3ºC) at 181.8ºC.

15. The salt of claim 12, which is a di-besylate salt of the compound of Formula (I), which is crystalline.

16. The salt of claim 15, wherein:

(a) the salt has at least four XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 6.3, 9.9, 12.1, 12.6, 15.9, 17.4, 18.7, 19.0, 19.6, and 25.1; or

(b) the salt has an endothermic peak with an onset temperature (± 3ºC) at 160.4ºC and a maximum temperature (± 3ºC) at 163.4ºC.

17. The salt of claim 12, which is a mono-mesylate salt of the compound of Formula (I), which is crystalline.

18. The salt of claim 17, wherein:

(a) the salt has at least four XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 4.8, 7.0, 11.9, 14.1, 14.9, 17.7, 18.9, 20.2, 22.1, and 26.1; or

(b) the salt has a first endothermic peak with a maximum temperature (± 3ºC) at 61.1ºC and a second endothermic peak with an onset temperature (± 3ºC) at 134.4ºC and a maximum temperature (± 3ºC) at 150.1ºC.

19. The salt of claim 12, which is a di-tosylate salt of the compound of Formula (I), which is crystalline.

20. The salt of claim 19, wherein:

(a) the salt has at least four XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 5.7, 7.8, 8.1, 9.3, 13.7, 13.9, 16.2, 18.8, and 20.6; or

(b) the salt has an exothermic peak with an onset temperature (± 3ºC) at 99.6ºC and a maximum temperature (± 3ºC) at 110.5ºC, and an endothermic peak with an onset temperature (± 3ºC) at 216.1ºC and a maximum temperature (± 3ºC) at 218.7ºC.

21. The salt of claim 12, which is a mono-hydrochloride salt of the compound of Formula (I), which is crystalline.

22. The salt of claim 21, wherein:

(a) the salt has at least four XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 5.7, 8.5, 11.3, 14.1, 15.0, 18.4, 19.3, 20.5, 21.8, 22.8, and 25.7; or

(b) the salt has an endothermic peak with an onset temperature (± 3ºC) at 196.0ºC and a maximum temperature (± 3ºC) at 212.2ºC.

23. The salt of claim 12, which is a di-hydrochloride salt of the compound of Formula (I), which is crystalline.

24. The salt of claim 23, wherein:

(a) the salt has at least four XRPD peaks, in terms of 2-theta (± 0.2 degrees), selected from 9.9, 10.7, 12.3, 13.0, 14.0, 15.2, 19.9, 21.8, 22.3, and 24.8; or

(b) the salt has an endothermic peak with an onset temperature (± 3ºC) at 182.1ºC and a maximum temperature (± 3ºC) at 206.4ºC.

25. A pharmaceutical composition comprising the solid form of any one of claims 1-11 or the salt of any one of claims 12-24, and a pharmaceutically acceptable carrier.

26. A method of inhibiting CDK2, comprising contacting *in vitro* the CDK2 with the solid form of any one of claims 1-11 or the salt of any one of claims 12-24.

27. Use of the solid form of any one of claims 1-11 or the salt of any one of claims 12-24, in the manufacture of a medicament for inhibition of CDK2 in a patient.

28. Use of the solid form of any one of claims 1-11 or the salt of any one of claims 12-24, in the manufacture of a medicament for the treatment of a disease or disorder associated with CDK2 in a patient, wherein the disease or disorder is cancer.

29. The use of claim 27 or 28, wherein the disease or disorder is associated with an amplification of the cyclin E1 (CCNE1) gene and/or overexpression of CCNE1.

30. Use of the solid form of any one of claims 1-11 or the salt of any one of claims 12-24, in the manufacture of a medicament for the treatment of a disease or disorder associated with cyclin-dependent kinase 2 (CDK2) in a human subject,
wherein the disease or disorder is cancer, and
wherein the solid form or salt is to be administered to the human subject, and
wherein the human subject has been previously determined to:

(i)

(a) have a nucleotide sequence encoding a p16 protein comprising the amino acid sequence of SEQ ID NO:1; and/or

(b) have a cyclin dependent kinase inhibitor 2A (CDKN2A) gene lacking one or more inactivating nucleic acid substitutions and/or deletions;

(ii)

(a) have an amplification of the cyclin E1 (CCNE1) gene; and/or

(b) have an expression level of CCNE1 in a biological sample obtained from the human subject that is higher than a control expression level of CCNE1.

31. Use of the solid form of any one of claims 1-11 or the salt of any one of claims 12-24, in the manufacture of a medicament for the treatment of a disease or disorder associated with cyclin-dependent kinase 2 (CDK2) in a human subject, wherein the disease or disorder is cancer, and

wherein:

(i) the solid form or salt is to be administered to the human subject, and

(ii) identifying, in a biological sample obtained from the human subject:

(a) a nucleotide sequence encoding a p16 protein comprising the amino acid sequence of SEQ ID NO:1; and/or

(b) a cyclin dependent kinase inhibitor 2A (CDKN2A) gene lacking one or more inactivating nucleic acid substitutions; and

(iii) identifying, in a biological sample obtained from the human subject:

(a) an amplification of the cyclin E1 (CCNE1) gene; and/or

(b) an expression level of CCNE1 that is higher than a control expression level of CCNE1.

32. The use of claim 31, comprising:

(i) identifying, in a biological sample obtained from the human subject:

(a) a nucleotide sequence encoding a p16 protein comprising the amino acid sequence of SEQ ID NO:1; and/or

(b) a CDKN2A gene lacking one or more inactivating nucleic acid substitutions and/or deletions;

(ii) identifying, in a biological sample obtained from the human subject:

(a) an amplification of the CCNE1 gene.

33. Use of the solid form of any one of claims 1-11 or the salt of any one of claims 12-24, in the manufacture of a medicament for evaluation of the response of a human subject having a disease or disorder associated with cyclin-dependent kinase 2 (CDK2), wherein the disease or disorder is cancer, and wherein:

(a) the solid form or salt is to be administered to the human subject, wherein the human subject has been previously determined to have an amplification of the cyclin E1 (CCNE1) gene and/or an expression level of CCNE1 that is higher than a control expression level of CCNE1;

(b) measuring, in a biological sample of obtained from the human subject subsequent to being administered the solid form or salt, the level of retinoblastoma (Rb) protein phosphorylation at the serine corresponding to amino acid position 780 of SEQ ID NO:3,

wherein a reduced level of Rb phosphorylation at the serine corresponding to amino acid position 780 of SEQ ID NO:3, as compared to a control level of Rb phosphorylation at the serine corresponding to amino acid position 780 of SEQ ID NO:3, is indicative that the human subject responds to the solid form or the salt.

34. The use of any one of claims 28-33, wherein the cancer is breast cancer.

35. The use of any one of claims 28-33, wherein the cancer is ovarian cancer.

36. The use of any one of claims 28-33, wherein the cancer is endometrial cancer.

37. The use of any one of claims 28-33, wherein the cancer is selected from lung cancer, fallopian tube cancer, gastrointestinal cancer, uterine cancer, urothelial cancer, anal cancer, bile duct cancer, cancer of the small bowel, cancer of the large bowel, colon cancer, colorectal cancer, rectal cancer, cancer of the small intestine, esophageal cancer, islet cell cancer, liver cancer, hepatocellular carcinoma, pancreatic cancer, gastric cancer, non-small cell lung cancer, small cell lung cancer, serous cystadenocarcinoma of the ovary, mucinous cystadenocarcinoma of the ovary, unclassified carcinoma of the ovary, an adenocarcinoma of the small bowel, a lymphoma of the small bowel, a carcinoid tumor of the small bowel, a Kaposi's sarcoma of the small bowel, a leiomyoma of the small bowel, a hemangioma of the small bowel, a lipoma of the small bowel, a neurofibroma of the small bowel, a fibroma of the small bowel, an adenocarcinoma of the large bowel, a tubular adenoma of the large bowel, a villous adenoma of the large bowel, a hamartoma of the large bowel, and a leiomyoma of the large bowel.

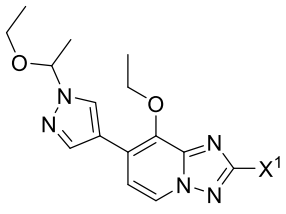
38. A process of preparing a solid form of any one of claims 1-3, comprising cooling a solution of the compound of Formula (I) in a solvent component comprising ethanol and water.

39. A process of preparing a solid form of any one of claims 4-7, comprising evaporating at 25 °C a solution of the compound of Formula (I) in a solvent selected from CH_2Cl_2, CH_3CN, EtOH, and IPA.

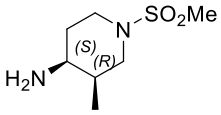
40. A process of preparing a solid form of any one of claims 8-11, comprising evaporating at 25 °C a solution of the compound of Formula (I) in 1,4-dioxane.

41. A process of preparing a compound of Formula (I), or a pharmaceutically acceptable salt thereof; a solid form of any one of claims 1-3; or the salt of any one of claims 12-24, comprising:

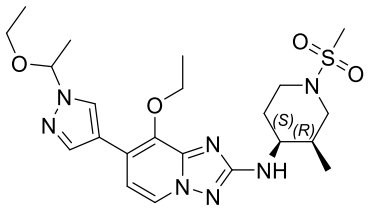
reacting a compound of Formula (1c):


(1c),

with a compound of Formula (1b):

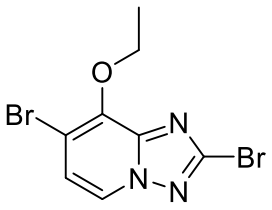

(1b),

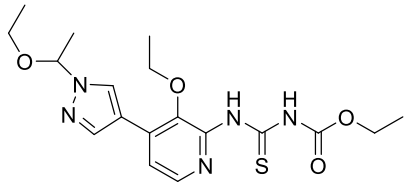
or a salt thereof, via a Buchwald coupling reaction, to form a compound of Formula (1a):

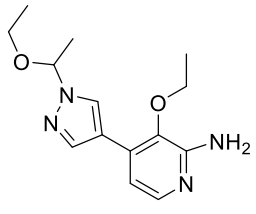

(1a),

wherein X^1 is halo.

42. A compound selected from:

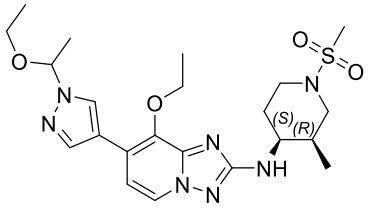

;


; and


;

or a salt thereof.

43. A hemi-succinate salt of a compound of Formula (1a):


(1a).