CLAIMS

1. A process for the production of anisotropic coke, the process comprising the steps of:

(v) providing a purified coal product (PCP), wherein the PCP is in particulate form, and wherein at least about 90% by volume (%v) of the particles are no greater than about 100 μm in diameter; wherein the PCP has an ash content of less than about 10%m and a water content of less than around 5%m;

(vi) combining the PCP with a feedstock oil in order to create a combined solid-liquid blend, wherein the solid-liquid blend comprises at least around 0.1 %m and at most around 50%m PCP;

(vii) subjecting the solid-liquid blend to a temperature in excess of 400 ˚C for a time period sufficient to induce formation of mesophase, and

(viii) producing anisotropic coke from the product of step (iii).

2. The process of claim 1, wherein at least about 90% by volume (%v) of the PCP particles are no greater than about 75 μm in diameter; optionally no greater than about 50 μm in diameter, optionally no greater than about 25 μm in diameter.

3. The process of claim 1 or 2, wherein the PCP has an ash content of less than about 2%m, suitably less than about 1.5%m; optionally not more than 1%m.

4. The process of any one of claims 1 to 3, wherein the PCP has a water content of less than around 2%m.

5. The process of any one of claims 1 to 4, wherein the PCP has a sulfur content of less than around 3%m; optionally no greater than around 1.5%m, optionally no greater than 0.5%m.

6. The process of any one of claims 1 to 5, wherein the feedstock oil comprises an oil having high aromatic content.

7. The process of claim 6, wherein the feedstock oil is selected from one or more of the group consisting of: a decanted oil; a heavy oil derived from coal tar; and a heavy oil derived from thermal cracker bottoms.

8. The process of any one of claims 1 to 7, wherein the solid-liquid blend of (iii) is used as a feedstock in a delayed coker in step (iv).

9. The process of claim 8, wherein the feedstock is introduced into a drum of a delayed coker.

10. The process of claim 8 or 9, wherein the feedstock is heated to a temperature of at least 400 °C.

11. The process of any one of claims 1 to 11, further comprising a step of calcining the anisotropic coke of step (iv) in order to produce a calcined needle coke.

12. The process of any one of claims 1 to 11, wherein the solid-liquid blend comprises at most around 40%m PCP, suitably at most around 30%m PCP; typically at most around 20%m PCP; and optionally at most around 10%m PCP.

13. A needle coke product obtainable by the process of any one of claims 1 to 12.

14. The needle coke product of claim 13, wherein the sulfur content of the product is less than around 0.6 %m.

15. The needle coke product of claim 13, wherein the nickel content of the product is less than around 500 ppm.w.

16. The needle coke product of claim 13, wherein the vanadium content of the product is less than around 500 ppm.w.

17. A carbon electrode comprised of the needle coke of claim 13.

18. A process for operating a delayed coker comprising:

(v) providing a purified coal product (PCP), wherein the PCP is in particulate form, and wherein at least about 90% by volume (%v) of the particles are no greater than about 100 μm in diameter; wherein the PCP has an ash content of less than about 5%m and a water content of less than around 5%m;

(vi) combining the PCP with a feedstock oil in order to create a combined solid-liquid blend, wherein the solid-liquid blend comprises at least around 0.1 %m and at most around 50%m PCP;

(vii) introducing the combined solid liquid blend to the delayed coker and subjecting the solid-liquid blend to a temperature in excess of 400 °C for a time period sufficient to induce formation of mesophase, and

(viii) producing anisotropic coke from the product of step (iii) within the delayed coker.

19. The process of claim 18, wherein the solid-liquid blend comprises at most around 40%m PCP, suitably at most around 30%m PCP; typically at most around 20%m PCP; and optionally at most around 10%m PCP.

20. The process of claims 18 or 19, wherein at least about 90% by volume (%v) of the PCP particles are no greater than about 75 μm in diameter; optionally no greater than about 50 μm in diameter, optionally no greater than about 25 μm in diameter.

21. The process of any one of claims 18 to 20, wherein the PCP has an ash content of less than about 2%m, suitably less than about 1.5%m; optionally not more than 1%m.

22. The process of any one of claims 18 to 21, wherein the PCP has a water content of less than around 2%m.

23. The process of any one of claims 18 to 22, wherein the PCP has a sulfur content of less than around 23%m; optionally no greater than around 1.5%m, optionally no greater than 0.5%m.

24. The process of any one of claims 18 to 23, wherein the feedstock oil comprises an oil having high aromatic content.

25. The process of claim 24, wherein the feedstock oil is selected from one or more of the group consisting of: a decanted oil; a heavy oil derived from coal tar; and a heavy oil derived from thermal cracker bottoms.

26. The use of a purified coal product (PCP), wherein the PCP is in particulate form, and wherein at least about 90% by volume (%v) of the particles are no greater than about 75 μm in diameter; wherein the PCP has an ash content of less than about 10%m and a water content of less than around 5%m, as an additive in a delayed coker process in order to increase the proportion of anisotropic coke produced by the process.

27. The use of claim 26, wherein the PCP is added to a decanted oil or a coal derived oil to create a feedstock for delayed needle coker process.

28. The use of claim 26 or 27, wherein at least about 90% by volume (%v) of the PCP particles are no greater than about 75 μm in diameter; optionally no greater than about 50 μm in diameter, optionally no greater than about 25 μm in diameter.

29. The use of any one of claims 26 to 28, wherein the PCP has an ash content of less than about 2%m, suitably less than about 1.5%m; optionally not more than 1%m.

30. The use of any one of claims 26 to 29, wherein the PCP has a water content of less than around 2%m.

31. The use of any one of claims 26 to 30, wherein the PCP has a sulfur content of less than around 3%m; optionally no greater than around 1.5%m, optionally no greater than 0.5%m.

32. The use of any one of claims 26 to 31, wherein the use results in an increase in the yield of needle coke from the delayed coker process.

33. A method for increasing the yield of needle coke produced by a delayed coker process comprising adding to a feedstock of decanted oil or a coal derived oil, not less than 0.1%m and not more than around 50%m of a PCP,

wherein the PCP is provided in solid particulate form, and wherein at least about 90% by volume (%v) of the particles are no greater than about 75 μm in diameter; wherein the PCP has an ash content of less than about 10%m and a sulfur content of less than around 3%m.

34. A method for increasing the yield of needle coke produced by a delayed coker process comprising adding to a feedstock of decanted oil or a coal derived oil, not less than 0.1%m and not more than around 50%m of a PCP,

wherein the PCP is provided as a coal particle-in-oil slurry, and wherein at least about 90% by volume (%v) of the particles are no greater than about 75 μm in diameter; wherein the PCP has an ash content of less than about 10%m and a sulfur content of less than around 3%m.

35. A mesophase promoting additive for use in a method of operating a delayed coker process, the additive comprising a purified coal product (PCP), wherein the PCP is in particulate form, and wherein at least about 90% by volume (%v) of the particles are no greater

than about 100 μm in diameter; wherein the PCP has an ash content of less than about 10%m and a water content of less than around 5%m.

CLAIMS

1. A process for the production of anisotropic coke, the process comprising the steps of:

(i) providing a purified coal product (PCP), in which the PCP is in particulate form, and in which at least about 90% by volume (%v) of the particles are no greater than about 100 μm in diameter; in which the PCP has an ash content of less than about 10%m and a water content of less than around 5%m;

(ii) combining the PCP with a feedstock oil in order to create a combined solid-liquid blend, in which the solid-liquid blend comprises at least around 0.1 %m and at most around 50%m PCP;

(iii) subjecting the solid-liquid blend to a temperature in excess of 400 ˚C for a time period sufficient to induce formation of mesophase, and

(iv) producing anisotropic coke from the product of step (iii).

2. A process according to Claim 1, in which at least about 90% by volume (%v) of the PCP particles are no greater than about 75 μm in diameter; optionally no greater than about 50 μm in diameter, optionally no greater than about 25 μm in diameter.

3. A process according to Claim 1 or 2, in which the PCP has an ash content of less than about 2%m.

4. A process according to Claim 1, 2 or 3, in which the PCP has a water content of less than around 2%m.

5. A process according to any preceding claim, in which the PCP has a sulfur content of less than around 3%m.

6. A process according to any preceding claim, in which the feedstock oil comprises an oil having high aromatic content.

7. A process according to Claim 6, in which the feedstock oil is selected from one or more of the group consisting of: a decanted oil; a heavy oil derived from coal tar; and a heavy oil derived from thermal cracker bottoms.

8. A process according to any preceding claim, in which the solid-liquid blend of (iii) is used as a feedstock in a delayed coker in step (iv).

9. A process according to Claim 8, in which the feedstock is introduced into a drum of a delayed coker.

10. A process according to Claim 8 or 9, in which the feedstock is heated to a temperature of at least 400 ˚C.

11. A process according to any preceding claim, further comprising a step of calcining the anisotropic coke of step (iv) in order to produce a calcined needle coke.

12. A process according to any preceding claim, in which the solid-liquid blend comprises at most around 40%m PCP.

13. A needle coke product obtainable by a process according to any preceding claim.

14. A method of using a purified coal product (PCP), in which the PCP is in particulate form, and in which at least about 90% by volume (%v) of the particles are no greater than about 75 μm in diameter; in which the PCP has an ash content of less than about 10%m and a water content of less than around 5%m, as an additive in a delayed coker process in order to increase the proportion of anisotropic coke produced by the process.

15. A method according to Claim 14, in which the PCP is added to a decanted oil or a coal derived oil to create a feedstock for delayed needle coker process.

16. A method according to Claim 14 or 15, in which at least about 90% by volume (%v) of the PCP particles are no greater than about 75 μm in diameter.

17. A method according to Claim 14, 15 or 16, in which the PCP has an ash content of less than about 2%m.

18. A method according to any of Claims 14 to 17, in which the PCP has a water content of less than around 2%m.

19. A method according to any of Claims 14 to 18, in which the PCP has a sulfur content of less than around 3%m.

20. A method according to any of Claims 14 to 19, in which the method results in an increase in the yield of needle coke from the delayed coker process.

21. A method for increasing the yield of needle coke produced by a delayed coker process comprising adding to a feedstock of decanted oil or a coal derived oil, not less than 0.1%m and not more than around 50%m of a PCP,

in which the PCP is provided in solid particulate form, and in which at least about 90% by volume (%v) of the particles are no greater than about 75 μm in diameter; in which the PCP has an ash content of less than about 10%m and a sulfur content of less than around 3%m.

22. A method for increasing the yield of needle coke produced by a delayed coker process comprising adding to a feedstock of decanted oil or a coal derived oil, not less than 0.1%m and not more than around 50%m of a PCP,

in which the PCP is provided as a coal particle-in-oil slurry, and in which at least about 90% by volume (%v) of the particles are no greater than about 75 μm in diameter; in which the PCP has an ash content of less than about 10%m and a sulfur content of less than around 3%m.

23. A mesophase promoting additive for use in a method of operating a delayed coker process, the additive comprising a purified coal product (PCP), in which the PCP is in particulate form, and in which at least about 90% by volume (%v) of the particles are no greater than about 100 μm in diameter; in which the PCP has an ash content of less than about 10%m and a water content of less than around 5%m.