CLAIMS

What is claimed is:

1. A method ~~process~~ for producing coke, the method ~~process~~ comprising:
   heating a heavy pitch to an incipient coking temperature in the range of 500°F to 750°F to produce a heated coker feedstock;
   feeding the heated coker feedstock to a coking drum;
   further heating the heated coker feedstock in situ within the coking drum via direct heat exchange; and
   subjecting the heated coker feedstock in the coking drum to thermal cracking to crack a portion of the heavy pitch to produce a cracked vapor product and a coke product.

2. The method ~~process~~ of claim 1, wherein the direct heat exchange is via contact of the heated coker feedstock with a superheating medium.

3. The method ~~process~~ of claim 1, wherein the steps of heating via direct heat exchange and subjecting occur concurrently.

~~4. The process of claim 1, wherein the incipient coking temperature is between 500°F and 750°F.~~

~~5.~~4.The method ~~process~~ of claim 1, further comprising feeding the cracked vapor product to a coker separator for recovery of one or more light hydrocarbon fractions.

~~6.~~5.The method ~~process~~ of claim 1, further comprising stopping the feed of heated coker feedstock to the coking drum and removal of the coke product from the coking drum.

~~7.~~6.The method ~~process~~ of claim 2, wherein the superheating medium is contacted with the heated coker feedstock via one or more of a feed inlet upstream of the coking drum, a superheating medium heater upstream of the coking drum , or a feed inlet introducing the superheating medium directly into the coking drum.

~~8.~~7.The method ~~process~~ of claim 2, wherein the superheating medium does not condense at coke drum operating conditions during a coking cycle.

9.8.The method process of claim 8, wherein the superheating medium is one or more of steam, carbon dioxide, nitrogen and other inert gases, or one or more light hydrocarbons.

10.9. The methodprocess of claim 2, wherein the superheating medium is fed to the coking drum during a filling cycle, during a coking cycle, or both.

11.10. The methodprocess of claim 1, wherein the heating of the heated coker feedstock in situ continues for a length of time required for the thermal cracking to approach completion.

12.11. The methodprocess of claim 1, wherein the heavy pitch is 100% heavy pitch.

13.12. The methodprocess of claim 1, wherein the heavy pitch comprises up to 10wt% of a diluent.

14.13. The methodprocess of claim 1, wherein the heavy pitch has a Conradson carbon content of 35 wt% or more, and an asphaltene content of 15wt% or more.

15.14. A methodprocess for producing coke, the methodprocess comprising:

heating a heavy pitch to an incipient coking temperature in the range of 500°F to 750°F to produce a heated coker feedstock;

mixing the heated coker feedstock with a superheating medium;

feeding the mixture to a coking drum;

heating the mixture in situ within the coking drum via direct heat exchange with the superheating medium; and

subjecting the mixture to thermal cracking in the coking drum to crack a portion of the heavy pitch to produce a cracked vapor product and a coke product.

16.15. The methodprocess of claim 1514; wherein the superheating medium is one or more of steam, carbon dioxide, nitrogen and other inert gases, or one or more light hydrocarbons.

17.16. The methodprocess of claim 1514, wherein the heating of the heated coker feedstock in situ continues for a length of time required for the thermal cracking to approach completion.

18.17. The methodprocess of claim 1514, wherein the heavy pitch is 100% heavy pitch.

~~19.~~18. The method~~process~~ of claim ~~15~~14, wherein the heavy pitch comprises up to 10wt% of a diluent.

~~20.~~19. The method~~process~~ of claim ~~15~~14, wherein the heavy pitch has a Conradson carbon content of 35 wt% or more, and an asphaltene content of 15wt% or more.

~~21.~~20. A system for producing coke, the system comprising:

a heater for heating a heavy pitch to an incipient coking temperature in the range of 500°F to 750°F to produce a heated coker feedstock;

a flow line for feeding the heated coker feedstock to a coking drum;

a heater for heating a superheating medium to produce a heated superheating medium;

a flow line for supplying the heated superheating medium for heating the heated coker feedstock in situ within the coking drum via direct heat exchange with the superheating medium;

a flow line for recovering a cracked vapor product from the coking drum.

~~22.~~21. The system of claim ~~21~~20, further comprising a mixer for mixing the heated coker feedstock with the superheating medium and a flow line for feeding the mixture to the coking drum.

~~23.~~22. The system of claim ~~21~~20, wherein the flow line for supplying the heated superheating medium is connected to the coking drum.

~~24.~~23. The system of claim ~~21~~20, further comprising a common heater, wherein the heater for heating the heavy pitch and the heater for heating the superheating medium are disposed in different zones of ~~a~~ the common heater.

~~25.~~24. The system of claim ~~21~~20, further comprising a control system for controlling the in situ heating of the heated coker feedstock within the coking drum.