CLAIMS

That which is claimed is:

1. An FCC catalyst for increased production of propylene and gasoline from heavy hydrocarbon feedstock, the catalyst comprising:

between 10 and 20% by weight of an ultra-stable Y-type zeolite;

between 10 and 20% by weight of a phosphorous modified sub-micron ZSM-5;

between 20 and 30% by weight of a pseudoboehmite alumina; and

between 30 and 40% by weight kaolin.

2. The catalyst of claim 1, wherein the phosphorous modified sub-micron ZSM-5 has a crystal size of less than 3 micron.

3. The catalyst of any of the preceding claims, wherein the phosphorous modified sub-micron ZSM-5 has a silica to alumina ratio in the range of between 1:2 and 1:4.

4. The catalyst of any of the preceding claims, wherein the phosphorous modified sub-micron ZSM-5 includes between 5 and 10% by weight phosphorous.

5. The catalyst of any of the preceding claims, wherein the psuedoboehmite alumina is peptized.

6. An FCC catalyst for enhanced production of light olefins from heavy hydrocarbon feedstock, the catalyst comprising:

between 10 and 20% by weight of an ultra-stable Y-type zeolite;

between 10 and 20% by weight of a pentasil zeolite;

between 20 and 30% by weight of a binder material; and

between 30 and 40% by weight clay filler material.

7. The catalyst of claim 6, wherein the pentasil zeolite is phosphorous modified sub-micron ZSM-5.

8. The catalyst of any of claims 6 or 7, wherein the binder material is a pseudoboehmite alumina.

9. The catalyst of any of claims 6 – 8, wherein the clay filler material is kaolin.

10. A process for the fluid catalytic cracking of a heavy hydrocarbon feedstock, the process comprising the steps of:

supplying a heavy hydrocarbon feedstock to the reaction zone of an FCC reactor and contacting the heavy hydrocarbon feedstock with a catalyst, the catalyst comprising between 10 and 20% by weight of a phosphorous modified sub-micron ZSM-5, between 10 and 20% by weight of an ultra-stable Y-type zeolite, between 20 and 30% by weight of a pseudoboehmite alumina, and between 20 and 40% by weight kaolin; and

maintaining the reaction zone such that the outlet temperature of the reaction zone is maintained at a temperature of 550°C,

wherein the catalyst and the heavy hydrocarbon feedstock are contacted for a time sufficient to crack the heavy hydrocarbon feedstock to product an effluent that comprises gasoline and propylene.

11. The process of claim 10, wherein the heavy hydrocarbon feedstock comprises a vacuum gas oil.

12. The process of any of claims 10 or 11, further comprising the step of regenerating the catalyst at a temperature of at least 700°C.

CLAIMS

1. An FCC catalyst for increased production of propylene and gasoline from heavy hydrocarbon feedstock, the catalyst comprising:

between 10 and 20% by weight of an ultra-stable Y-type zeolite;

between 10 and 20% by weight of a phosphorous modified sub-micron ZSM-5;

between 20 and 30% by weight of a pseudoboehmite alumina; and

between 30 and 40% by weight kaolin,

wherein the phosphorous modified sub-micron ZSM-5 has a silica to alumina molar ratio in the range of between 1:2 and 1:4.

2. The catalyst of claim 1, wherein the phosphorous modified sub-micron ZSM-5 has a crystal size of less than 3 micron.

3. The catalyst of any of the preceding claims, wherein the phosphorous modified sub-micron ZSM-5 includes between 5 and 10% by weight phosphorous, present as P_2O_5.

4. The catalyst of any of the preceding claims, wherein the pseudoboehmite alumina is peptized.

5. An FCC catalyst for enhanced production of light olefins from heavy hydrocarbon feedstock, the catalyst comprising:

between 10 and 20% by weight of an ultra-stable Y-type zeolite;

between 10 and 20% by weight of a pentasil zeolite;

between 20 and 30% by weight of a binder material; and

between 30 and 40% by weight clay filler material,

wherein the pentasil zeolite has a silica to alumina molar ratio in the range of between 1:2 and 1:4.

6. The catalyst of claim 5, wherein the pentasil zeolite is phosphorous modified sub-micron ZSM-5.

7. The catalyst of any of claims 5 or 6, wherein the binder material is a pseudoboehmite alumina.

8. The catalyst of any of claims 5 – 7, wherein the clay filler material is kaolin.

9. A process for the fluid catalytic cracking of a heavy hydrocarbon feedstock, the process comprising the steps of:

supplying a heavy hydrocarbon feedstock to the reaction zone of an FCC reactor and contacting the heavy hydrocarbon feedstock with a catalyst, the catalyst comprising between 10 and 20% by weight of a phosphorous modified sub-micron ZSM-5, between 10 and 20% by weight of an ultra-stable Y-type zeolite, between 20 and 30% by weight of a pseudoboehmite alumina, and between 20 and 40% by weight kaolin; and

maintaining the reaction zone such that the outlet temperature of the reaction zone is maintained at a temperature of 550°C,

wherein the catalyst and the heavy hydrocarbon feedstock are contacted for a time sufficient to crack the heavy hydrocarbon feedstock to product an effluent that comprises gasoline and propylene, and

wherein the phosphorous modified sub-micron ZSM-5 has a silica to alumina molar ratio in the range of between 1:2 and 1:4.

10. The process of claim 9, wherein the heavy hydrocarbon feedstock comprises a vacuum gas oil.

11. The process of any of claims 9 or 10, further comprising the step of regenerating the catalyst at a temperature of at least 700°C.