CLAIMS

What is claimed is:

1. A process for producing paraxylene from light and heavy hydrocarbons, particularly C_4 stream and C_{5+} naphtha stream from catalytic cracking unit, said process comprising:

a) separating a C_5-C_9 non-aromatics stream and a first C_6-C_{10+} aromatics stream from the C_{5+} catalytic naphtha streamand separating C_6-C_9 non-aromatics from C_6-C_9 aromatics;

b) forming a second C_6-C_{10} aromatics stream from the C_4 stream and the C_5-C_9 non-aromatics stream, wherein at least one of the C_4 stream and the C_5-C_9 non-aromatics stream contains olefins; forming aromatics from C_4-C_9 non-aromatics or a subset thereof, wherein the C_4-C_9 non-aromatics or the subset contains olefins;

c) removing impurities from the first and second C_6-C_{10} aromatics streams to create a purified C_6-C_{10} aromatics stream before they are sent to the downstream processes;

d) separating from the purified C_6-C_{10} aromatics stream, non-aromatics in the a C_6-C_7 stream, a or C_6-C_8 stream to yield high purity aromatics, and to separate C_8 and a C_{9+} C_{9+} streams; and

e) feeding the C_8 stream into a paraxylene production section to produceing a high-purity paraxylene product.

2. The process of claim 1, wherein step a) includes a distillation step and an extraction step.

3. The process of claim 2, wherein said extraction step is carried out by using extractive distillation method or liquid-liquid extraction method.

4. The process of claim 1, wherein step b) is carried out in a single reactor or multiple reactors that are fixed bed reactors or continuous regeneration (CCR) type reactor systems.

5. The process of claim 1, wherein said C_4-C_9 non-aromatics or the subset in step b) contains 15-85 wt% olefins.

6. The process of claim 1, wherein the removing of impurities in step c) is carried out using hydrogenation, adsorption, absorption, or solvent extraction, or a combination thereof.

7 The process of claim 1, wherein the removing of impurities in step c) is optional.

8. The process of claim 1, wherein step d) includes a distillation step and an extraction step.

9. The process of claim 8, wherein said extraction step is carried out by using extractive distillation method, liquid-liquid extraction method, or other methods known to the industry.

10. The process of claim 1, wherein the production of paraxylene includes paraxylene recovery and xylene isomerization.

11. The process of claim 10, wherein paraxylene recovery is carried out by using a crystallization method or adsorption method or a combination thereof.

12. The process of claim 10, wherein xylene isomerization uses EB -isomerization type of catalyst or EB-dealkylation type of catalyst.

13. A process for producing paraxylene from light and heavy hydrocarbons, particularly C4 stream and C_{5+} naphtha stream from catalytic cracking unit, said process comprising:

~~a) separating C_5 and C_{10+} from the C_{5+} catalytic naphtha and separating C_6-C_9 non-aromatics from C_6-C_9 aromatics;~~

~~b) forming aromatics from C_4-C_9 non-aromatics or a subset thereof, wherein the C_4-C_9 non-aromatics or the subset contains olefins;~~

~~c) removing impurities to clean the aromatics before they are sent to the downstream processes;~~

~~d) producing a high-purity paraxylene product; and~~

~~e) producing xylenes from C_6, C_7, C_9-C_{10} aromatics.~~

a) separating a C_5-C_9 non-aromatics stream and a first C_6-C_{10} aromatics stream from the C_{5+} catalytic naphtha stream;

b) forming a second C_6-C_{10} aromatics stream from the C_4 stream and the C_5-C_9 non-aromatics stream, wherein at least one of the C_4 stream and the C_5-C_9 non-aromatics stream contains olefins;

c) removing impurities from the first and second C_6-C_{10} aromatics streams to create a purified C_6-C_{10} aromatics stream before they are sent to the downstream processes;

d) separating from the purified C_6-C_{10} aromatics stream, a C_6-C_7 stream, a first C_8 stream, a C_9-C_{10} stream and a C_{11+} stream;

e) feeding the C_6-C_7 stream and the C_9-C_{10} stream into a xylene formation section to form a second C_8 stream; and

f) feeding the first and second C_8 stream into a paraxylene production section to produce a paraxylene product.

14. The process of claim 13, wherein step a) includes a distillation step and an extraction step.

15. The process of claim 14, wherein said extraction step is carried out by using extractive distillation method or liquid-liquid extraction method.

16. The process of claim 13, wherein step b) is carried out in a single reactor or multiple reactors that are fixed bed reactors or continuous regeneration (CCR) type reactor systems.

17. The process of claim 13, wherein said C_4-C_9 non-aromatics or the subset in step b) contains 15-85 wt% olefins.

18. The process of claim 13, wherein the removing of impurities in step c) is carried out using hydrogenation, adsorption, absorption, or solvent extraction, or a combination thereof.

19. The process of claim 13, wherein the removing of impurities in step c) is optional.

~~20. The process of claim 13, wherein an optional second separation step is provided downstream of step c) to separate C_6-C_7, C_8, C_9-C_{10}, and C_{11+} streams.~~

2~~0~~1. The process of claim 13~~20~~, wherein the ~~second~~ separation of the purified C_6-C_{10} aromatics stream in step d) includes a distillation step and an extraction step.

~~22. The process of claim 21, wherein said extraction step is to separate non-aromatics in the C_6-C_7 stream or C_6-C_8 steam to yield high-purity aromatics.~~

2~~1~~3. The process of claim 2~~0~~1, wherein said extraction step is carried out by using extractive distillation method, liquid-liquid extraction method, or other methods known to the industry.

224. The process of claim 13, wherein the production of paraxylene includes paraxylene recovery and xylene isomerization.

235. The process of claim 224, wherein paraxylene recovery is carried out by using a crystallization method or adsorption method or a combination thereof.

246. The process of claim 224, wherein xylene isomerization uses EB -isomerization type of catalyst or EB-dealkylation type of catalyst.

257. The process of claim 13, wherein the production of xylenes uses benzene methylation, toluene methylation, benzene/toluene methylation, benzene/C_9-C_{10} transalkylation, toluene/C_9-C_{10} transalkylation, benzene/toluene/ C_9-C_{10} transalkylation, toluene disproportionation (TDP), selective toluene disproportionation (STDP) or a combination thereof.

CLAIMS

What is claimed is:

1. A process for producing paraxylene from light and heavy hydrocarbons, particularly C_4 stream and C_{5+} naphtha stream from catalytic cracking unit, said process comprising:

a) separating a C_5-C_9 non-aromatics stream and a first C_6-C_{10+} aromatics stream from the C5+ catalytic naphtha stream;

b) forming a second C_6-C_{10} aromatics stream from the C_4 stream and the C_5-C_9 non-aromatics stream in an aromatization unit, wherein at least one of the C_4 stream and the C_5-C_9 non-aromatics stream contains olefins;

c) removing impurities from the first and second C_6-C_{10} aromatics streams to create a purified C_6-C_{10} aromatics stream before they are sent to the downstream processes;

d) separating from the purified C_6-C_{10} aromatics stream, a C_6-C_7 stream, a C_8 stream and a C_{9+} stream;

e) feeding the C_8 stream into a paraxylene production section to produce a paraxylene product.

2. The process of claim 1, wherein step a) includes a distillation step and an extraction step.

3. The process of claim 2, wherein said extraction step is carried out by using extractive distillation method or liquid-liquid extraction method.

4. The process of claim 1, wherein step b) is carried out in a single reactor or multiple reactors that are fixed bed reactors or continuous regeneration (CCR) type reactor systems.

5. The process of claim 1, wherein said C_4-C_9 non-aromatics or the subset in step b) contains 15-85 wt% olefins.

6. The process of claim 1, wherein the removing of impurities in step c) is carried out using hydrogenation, adsorption, absorption, or solvent extraction, or a combination thereof.

7. The process of claim 1, wherein the removing of impurities in step c) is optional.

8. The process of claim 1, wherein step d) includes a distillation step and an extraction step.

9. The process of claim 8, wherein said extraction step is carried out by using extractive distillation method, or liquid-liquid extraction method.

10. The process of claim 1, wherein the production of paraxylene includes paraxylene recovery and xylene isomerization.

11. The process of claim 10, wherein paraxylene recovery is carried out by using a crystallization method or adsorption method or a combination thereof.

12. The process of claim 10, wherein xylene isomerization uses EB-isomerization type of catalyst or EB-dealkylation type of catalyst.

13. A process for producing paraxylene from light and heavy hydrocarbons, particularly C_4 stream and C_{5+} naphtha stream from catalytic cracking unit, said process comprising:

a) separating a C_5-C_9 non-aromatics stream and a first C_6-C_{10} aromatics stream from the C_{5+} catalytic naphtha stream;

b) forming a second C_6-C_{10} aromatics stream from the C_4 stream and the C_5-C_9 non aromatics stream in an aromatization unit, wherein at least one of the C_4 stream and the C_5-C_9 non-aromatics stream contain olefins;

c) removing impurities from the first and second C_6-C_{10} aromatics streams to create a purified C_6-C_{10} aromatics stream before they are sent to the downstream processes;

d) separating from the purified C_6-C_{10} aromatics stream, a C_6-C_7 stream, a first C_8 stream, a C_9-C_{10} stream and a C_{11+} stream;

e) feeding the C_6-C_7 stream and the C_9-C_{10} stream into a xylene formation section to form a second C_8 stream; and

f) feeding the first and second C_8 stream into a paraxylene production section to produce a paraxylene product.

14. The process of claim 13, wherein step a) includes a distillation step and an extraction step.

15. The process of claim 14, wherein said extraction step is carried out by using extractive distillation method or liquid-liquid extraction method.

16. The process of claim 13, wherein step b) is carried out in a single reactor or multiple reactors that are fixed bed reactors or continuous regeneration (CCR) type reactor systems.

17. The process of claim 13, wherein said C4-C9 non-aromatics or the subset in step b) contains 15-85 wt% olefins.

18. The process of claim 13, wherein the removing of impurities in step c) is carried out using hydrogenation, adsorption, absorption, or solvent extraction, or a combination thereof.

19. The process of claim 13, wherein the removing of impurities in step c) is optional.

20. The process of claim 13, wherein the separation of the purified C_6-C_{10} aromatics stream in step d) includes a distillation step and an extraction step.

21. The process of claim 20, wherein said extraction step is carried out by using extractive distillation method, or liquid-liquid method.

22. The process of claim 13, wherein the production of paraxylene includes paraxylene recovery and xylene isomerization.

23. The process of claim 22, wherein paraxylene recovery is carried out using a crystallization method or adsorption method or a combination thereof.

24. The process of claim 22, wherein xylene isomerization uses EB-isomerixation type of catalyst or EB-dealkylation type of catalyst.

25. The process of claim 13, wherein the production of xylenes uses benzene methylation, toluene methylation, benzene/toluene methylation, benzene/C_9-C_{10} transalkylation, toluene/C_9-C_{10} transalkylation, benzene/toluene/C_9-C_{10} transalkylation, toluene disproportionation (TDP), selective toluene disproportionation (STDP) or a combination thereof.