CLAIMS

1. A catalyst composition comprising a first zeolite having a BEA* framework type and a second zeolite having a MOR framework type and a mesopore surface area of greater than 30 m^2/g as measured by BET.

2. The catalyst composition of claim 1, wherein said first zeolite is zeolite beta.

3. The catalyst composition of claim 1, wherein said second zeolite is EMM-34.

4. The catalyst composition of claim 3, wherein said second zeolite comprising agglomerates of primary crystallites, wherein said primary crystallites have an average primary crystal size of less than 80 nm in each of the a, b and c crystal vectors as measured by X-ray diffraction and an aspect ratio of less than 2, wherein the aspect ratio is defined as the longest dimension of the crystallite divided by the width of the crystallite, wherein said width of the crystallite is defined as the dimension of the crystallite in the middle of that longest dimension in a direction orthogonal to that longest dimension, as measured by TEM.

5. The catalyst composition of claim 4, wherein said EMM-34 has a ratio of the mesopore surface area to the total surface area of greater than 0.05.

6. The catalyst composition of claim 5, wherein said second zeolite is synthesized from TEA or MTEA.

7. The catalyst composition of claim 6, wherein the Si/Al_2 molar ratio of said second zeolite is in the range of 10 to 60.

8. The catalyst composition of claim 7, wherein said catalyst composition has a collidine uptake in the range of 550 µmoles/g to 1500 µmoles/g.

9. The catalyst composition of claim 8, wherein the ratio of said first zeolite to said second zeolite is in the range of 90:10 to 50:50 by weight of the catalyst composition.

10. The catalyst composition of claim 9, wherein said first zeolite and said second zeolite are co-crystallized or co-extruded.

11. A method for removing impurities from a hydrocarbon stream, the method comprising the steps of:

(a) supplying a portion of a feed stream and a guard bed catalyst, said feed stream comprising one or more hydrocarbons and undesirable impurities, said impurities comprise at least one compound having at least one of the following elements: nitrogen, halogens, oxygen, sulfur, arsenic, selenium, tellurium, phosphorus, and Group 1 through Group 12 metals, said guard bed catalyst comprises a catalyst composition of claim 1; and

(b) contacting said portion of said feed stream with said guard bed catalyst to remove at least a portion of said impurities and produce a treated feed stream having a reduced amount of impurities.

12. The method of claim 11, wherein said feed stream and said guard bed are supplied to a guard bed for contacting therein.

13. A process for producing a mono-alkylated aromatic compound comprising the steps of:

(a) providing a guard bed having a guard bed catalyst disposed therein, said guard bed catalyst comprises a catalyst composition of claim 1;

(b) supplying at least a portion of an untreated feed stream to said guard bed, said untreated feed stream comprising an alkylatable aromatic compound and undesirable impurities, wherein said impurities comprise at least one compound having at least one of the following elements: nitrogen, halogens, oxygen, sulfur, arsenic, selenium, tellurium, phosphorus, and Group 1 through Group 12 metals;

(c) contacting said portion of said untreated feed stream of step (b) with said guard bed catalyst to remove at least a portion of said impurities and produce a treated feed stream having a reduced amount of impurities; and

(d) contacting at least a portion of said treated feed stream of step (c) and an alkylating agent stream with an alkylation catalyst which is the same or different from said guard bed catalyst under suitable at least partially liquid phase reaction conditions

to alkylate at least a portion of said alkylatable aromatic compound with said alkylating agent stream to produce an effluent stream comprising said mono-alkylated aromatic compound and poly-alkylated aromatic compounds.

14. The process of claim 13, wherein step (b) further includes supplying an alkylating agent stream to said guard bed.

15. The process of claim 14, wherein step (c) further includes contacting said alkylating agent stream with said alkylatable aromatic compound in the presence of said guard bed catalyst to produce additional said mono-alkylated aromatic compound.

16. The process of claim 15, wherein said alkylation catalyst comprises an acidic aluminosilicate.

17. The process of claim 16, wherein said aluminosilicate is any one of a MCM-22 family molecular sieve, faujasite, mordenite, zeolite beta, or combinations of two or more thereof.

18. The process of claim 17, wherein said MCM-22 family molecular sieve is any one of MCM-22, PSH-3, SSZ-25, MCM-36, MCM-49, MCM-56, ERB-1, EMM-10, EMM-10-P, EMM-12, EMM-13, UZM-8, UZM-8HS, UZM-37, ITQ-1, ITQ-2, ITQ-30, MIT-1, or combinations of two or more thereof.

19. The process of claim 18, further comprising the steps:

(e) separating said effluent stream of step (d) to recover a mono-alkylated aromatic compound stream and a poly-alkylated aromatic compounds stream.

20. The process of claim 19, further comprising the step of:

(f) contacting said poly-alkylated aromatic compound stream and another portion of said untreated feed stream of step (b) with a transalkylation catalyst under suitable at least partially liquid phase transalkylation conditions to transalkylate said poly-alkylated aromatic compound stream with said alkylatable aromatic compound and produce additional said mono-alkylated aromatic compound.

21. The process of claim 20, wherein prior to step (f) said another portion of said untreated feed stream is first contacted with a guard bed catalyst to remove at least a portion of said impurities, said guard bed catalyst comprises a catalyst composition of claim 1.

22. The process of claim 20, wherein said transalkylation catalyst is a large pore molecular sieve having a constraint index of less than 2 or a MCM-22 family material.

23. The process of claim 22, wherein said large pore molecular sieve is selected from the group of consisting of zeolite beta, faujasite, zeolite Y, Ultrastable Y (USY), Dealuminized Y (Deal Y), Rare Earth Y(REY), Ultrahydrophobic Y (UHP-Y), mordenite, TEA-mordenite, EMM-34, ZSM-2, ZSM-3, ZSM-4, ZSM-14, ZSM-18, ZSM-20, ECR-4, ECR-17, ECR-32, ECR-35 and combinations thereof.

24. The process of claim 13, wherein said alkylatable aromatic compound is benzene, said mono-alkylated aromatic compound is ethylbenzene and said poly-alkylated aromatic compound is poly-ethylbenzene.

25. The process of claim 13, wherein said alkylatable aromatic compound is benzene, said mono-alkylated aromatic compound is cumene and said poly-alkylated aromatic compound is poly-isopropylbenzene.