CLAIMS

What is claimed is:

1. A method of producing an alkylaromatic by the alkylation of an aromatic with an alkylating agent while reactivating an alkylation catalyst, the method comprising:

providing at least one reaction zone comprising at least one preliminary alkylation reactor upstream from at least one primary alkylation reactor, wherein the at least one preliminary alkylation reactor contains an ~~containing a~~ H-beta zeolite catalyst, and wherein the ~~at least one reaction zone comprises at least one preliminary alkylation reactor and~~ at least one primary alkylation reactor contains the alkylation catalyst;

introducing a feed stream comprising ~~an~~ the aromatic and ~~an~~ the alkylating agent to the reaction zone; and

reacting at least a portion of the aromatic under alkylation conditions to produce ~~an~~ the alkylaromatic;

wherein the alkylation catalyst in the primary alkylation reactor experiences catalyst reactivation when the preliminary alkylation reactor is in continual service, without taking the alkylation catalyst out of service for regeneration of the alkylation catalyst.

2. The method of claim 1, wherein the feed stream further comprises catalyst poisons averaging at least 5 ppb.

3. The method of claim 1, wherein the feed stream further comprises catalyst poisons averaging at least 30 ppb.

4. The method of claim 1, wherein the feed stream further comprises catalyst poisons averaging at least 75 ppb.

5. The method of claim 1, wherein the amount of H-beta catalyst in the at least one reaction zone is at least 3,000 pounds.

6. The method of claim 1, wherein the amount of H-beta catalyst in the at least one reaction zone is between 3,000 pounds and 50,000 pounds in a first preliminary alkylation system.

7. The method of claim 1, wherein the alkylaromatic production is at least 0.5 million pounds per day.

8. The method of claim 1, wherein the alkylaromatic is ethylbenzene, the aromatic is benzene and the alkylating agent is ethylene.

9. The method of claim 1, wherein the primary alkylation reactor comprises one or more reaction zones containing ~~an~~ the alkylation catalyst that had experienced catalyst deactivation, and wherein after the introduction of the H-beta catalyst in the at least one preliminary alkylation reactor the alkylation catalyst in the primary alkylation reactor ~~catalyst~~ experienced no further deactivation for a period of at least one year.

10. The method of claim 9, wherein the alkylation catalyst in the primary alkylation reactor ~~catalyst~~ experienced no further deactivation for a period of at least 18 months.

11. The method of claim 9, wherein the alkylation catalyst in the primary alkylation reactor ~~catalyst~~ experienced no further deactivation for a period of at least 24 months.

12. The method of claim 9, wherein the at least one preliminary alkylation reactor contains H-beta zeolite catalyst in a quantity of between at least 3,000 pounds to 50,000 pounds.

13. The method of claim 9, wherein at least a portion of the at least one preliminary alkylation ~~system~~ reactor can be bypassed for catalyst regeneration without taking the at least one primary alkylation reactor out of service.

14. The method of claim 1, wherein the at least one reaction zone contains a mixed catalyst that includes H-beta zeolite catalyst and at least one other catalyst.

15. The method of claim 9, wherein the preliminary alkylation reactor contains a mixed catalyst that includes H-beta zeolite catalyst and at least one other catalyst.

16. The method of claim 9, wherein the primary alkylation reactor contains a mixed catalyst that includes H-beta zeolite catalyst and at least one other catalyst.

17. A process of reactivating an alkylation catalyst that has experienced deactivation, the process comprising:

providing a first reaction zone containing an alkylation catalyst that has experienced deactivation;

providing a second reaction zone containing H-beta zeolite catalyst upstream of the first reaction zone;

introducing a feed stream comprising benzene and ethylene to the reaction zones; and

reacting at least a portion of the benzene with ethylene under alkylation conditions in both the first and second reaction zones to produce ethylbenzene;

wherein the alkylation catalyst experiences catalyst reactivation when the second reaction zone is operated continually, without taking the alkylation catalyst out of service for regeneration of the alkylation catalyst.

18. The process of claim 17, wherein the alkylation catalyst regains at least 1% of its activation when the second reaction zone is operated continually, without taking the alkylation catalyst out of service for regeneration of the alkylation catalyst.

19. The process of claim 17, wherein the alkylation catalyst regains at least 5% of its activation when the second reaction zone is operated continually, without taking the alkylation catalyst out of service for regeneration of the alkylation catalyst.

20. The process of claim 17, wherein the feed stream further comprises catalyst poisons averaging at least 5 ppb.

21. The process of claim 17, wherein the feed stream further comprises catalyst poisons averaging at least 30 ppb.

22. The process of claim 17, wherein the feed stream further comprises catalyst poisons averaging at least 75 ppb.

23. The process of claim 17, wherein the amount of H-beta catalyst in the second reaction zone is at least 3,000 pounds.

24. The process of claim 17, wherein the amount of H-beta catalyst in the second reaction zone is between 3,000 pounds and 50,000 pounds in a first preliminary alkylation system.