

CLAIMS:

1. A process for alkylating an aromatic hydrocarbon reactant with an alkylating reagent comprising methanol to produce an alkylated aromatic product, comprising:

- 5 introducing the aromatic hydrocarbon into a reactor having an inner refractory lining having a low iron content; and
recovering the alkylate aromatic product, produced by reaction of the aromatic reactant and the alkylating reagent, from the reactor.

2. The process of claim 1, wherein the aromatic hydrocarbon reactant includes toluene, the alkylating reagent includes methanol, and the alkylated aromatic product includes xylene.

3. The process of claim 1, wherein the aromatic hydrocarbon reactant includes benzene, the alkylating reagent includes methanol, and the alkylated aromatic product includes xylene.

4. The process of claim 1, wherein the reactor operates at a temperature of 500°C to 700°C.

5. The process of claim 1, wherein the reactor operates at a pressure of 1 barg to 10 barg.

6. The process of any one of claims 1 to 5, wherein the entire inside lining of the reactor is coated with the refractory.

7. The process of any one of claims 1 to 5, wherein the refractory comprises a low iron content between 0.0001 wt% to 0.5 wt% iron.

8. The process of any one of claims 1 to 5, wherein the refractory comprises a low iron content between 0.0001 wt% to 0.15 wt% iron.

9. The process of any one of claims 1 to 5, further comprising adding water to the reactor.

10. An apparatus for alkylating an aromatic hydrocarbon reactant with an alkylating reagent comprising methanol to produce an alkylated aromatic product, comprising:

- 5 a line comprising the aromatic hydrocarbon in upstream communication with a reactor having an inner refractory lining; and
- a line in downstream communication with the reactor comprising the alkylated aromatic product, produced by reaction of the aromatic reactant and the alkylating reagent, from the reactor.