

CLAIMS:

1. An apparatus for alkylating an aromatic hydrocarbon reactant with an alkylating reagent comprising methanol to produce an alkylated aromatic product, comprising:
a line comprising the aromatic hydrocarbon in upstream communication with a reactor
5 having an inner refractory lining; and
a line in downstream communication with the reactor comprising the alkylate aromatic product, produced by reaction of the aromatic reactant and the alkylating reagent, from the reactor.
2. The apparatus of claim 1, wherein the aromatic hydrocarbon reactant includes
10 toluene, the alkylating reagent includes methanol, and the alkylated aromatic product includes xylene.
3. The apparatus of claim 1, wherein the aromatic hydrocarbon reactant includes benzene, the alkylating reagent includes methanol, and the alkylated aromatic product includes xylene.
- 15 4. The apparatus of claim 1, wherein the entire inside lining of the reactor is coated with the refractory.
5. The apparatus of claim 1, wherein the refractory comprises a mixed oxide refractory prepared using liquid phosphate as a chemical binder.
6. A process for alkylating an aromatic hydrocarbon reactant with an alkylating
20 reagent comprising methanol to produce an alkylated aromatic product, comprising:
introducing the aromatic hydrocarbon into a reactor having an inner refractory lining;
and
recovering the alkylate aromatic product, produced by reaction of the aromatic
reactant and the alkylating reagent, from the reactor.
- 25 7. The process of claim 6, wherein the aromatic hydrocarbon reactant includes toluene, the alkylating reagent includes methanol, and the alkylated aromatic product includes xylene.
8. The process of claim 6, wherein the aromatic hydrocarbon reactant includes
30 benzene, the alkylating reagent includes methanol, and the alkylated aromatic product includes xylene.

9. The process of claim 6, wherein the reactor operates at a temperature of 500°C to 700°C.
10. The process of claim 6, wherein the reactor operates at a pressure of 1 barg to 10 barg.