In one aspect, there is provided a process for producing liquid hydrocarbon products, comprising:

(a) introducing an acidic ionic liquid to a reactor comprising a solid support that is a porous particulate having pores up to 200 Å;

(b) feeding to the reactor a feed stream comprising a Brønsted acid and a hydrocarbon mixture comprising:

i. at least one alkylatable hydrocarbon, and

ii. at least one alkylating agent; and

(c) collecting one or more liquid hydrocarbon products in an effluent from the reactor, wherein the one or more liquid hydrocarbon products are oligomer products made from the alkylatable hydrocarbon; and wherein the one or more liquid hydrocarbon products comprise from 5 wt% to 25.8 wt% hydrocarbons with a boiling point less than 130°C.

In one aspect, there is provided a process for producing liquid hydrocarbon products, comprising:

(a) introducing an acidic ionic liquid to a reactor comprising a solid support that is a porous particulate having pores up to 200 Å;

(b) feeding to the reactor a feed stream comprising a Brønsted acid and a hydrocarbon mixture;

(c) cooling the reactor by evaporating, in situ, a volatile hydrocarbon from a reaction zone in the reactor; and

(d) collecting one or more liquid hydrocarbon products in an effluent from the reactor, wherein the one or more liquid hydrocarbon products are oligomer products, alkylate products, or mixtures thereof, made from the hydrocarbon mixture; and wherein the one or more liquid hydrocarbon

products comprise from 5 wt% to 25.8 wt% hydrocarbons with a boiling point less than 130°C.

In one aspect, there is provided a process for producing liquid hydrocarbon products, comprising:

(a) introducing an acidic ionic liquid to a reactor comprising a solid support that is a porous particulate having pores up to 200 Å;

(b) feeding to the reactor a feed stream comprising a Brønsted acid and a hydrocarbon mixture comprising:

i. at least one alkylatable hydrocarbon, and

ii. at least one alkylating agent;

(c) independently varying a flow of the acidic ionic liquid during the introducing and a flow of the feed stream during the feeding; and

(d) collecting one or more liquid hydrocarbon products in an effluent from the reactor; wherein a fresh acidic ionic liquid is added continuously to the reactor and a passivated acidic ionic liquid is withdrawn continuously from the reactor; wherein the one or more liquid hydrocarbon products are oligomer products, alkylate products, or mixtures thereof, made from the alkylatable hydrocarbon; and wherein the one or more liquid hydrocarbon products comprise a middle distillate, a base oil, or a mixture thereof; and wherein the one or more liquid hydrocarbon products additionally comprise from 5 wt% to 25.8 wt% hydrocarbons with a boiling point less than 130°C.

In one aspect, there is provided a process for producing liquid hydrocarbon products, comprising:

(a) introducing an acidic ionic liquid to a reactor comprising a solid support that is a porous particulate having pores up to 200 Å;

(b) feeding to the reactor a feed stream comprising a Brønsted acid and a hydrocarbon mixture comprising:

i. at least one alkylatable hydrocarbon, and

ii. at least one alkylating agent;

(c) controlling the reactor at a temperature from 10°C to 35°C; and

(d) collecting one or more liquid hydrocarbon products in an effluent from the reactor, wherein the one or more liquid hydrocarbon products are oligomer products, alkylate products, or mixtures thereof, made from the alkylatable hydrocarbon; and wherein the one or more liquid hydrocarbon products comprise from 5 wt% to 25.8 wt% hydrocarbons with a boiling point less than 130°C.