CLAIMS

1. A method of cracking a hydrocarbon feed comprising:

introducing a hydrocarbon feed to a cracking reactor, where the hydrocarbon feed is liquid;

introducing a heat generating material (HGM) stream comprising at least one aldehyde or ketone to the cracking reactor;

vaporizing the hydrocarbon feed and the HGM stream; and

cracking the hydrocarbon feed to produce a cracking product, where the cracking product comprises C_1-C_4 hydrocarbons and C_5+ hydrocarbons;

where the HGM stream and the hydrocarbon feed stream are fed at a weight ratio of 1:1 to 10:1.

2. The method of claim 1, where the HGM stream comprises ketone.

3. The method of claim 1 or 2, where the HGM stream comprises an aldehyde.

4. The method of claim 3, where the aldehyde is formaldehyde dissolved in water.

5. The method of claim 4, where the formaldehyde dissolved in water is stabilized with an organic solvent.

6. The method of any of claims 1 to 5, where the HGM stream further comprises an alcohol, an additional ketone, or an additional aldehyde.

7. The method of any of claims 1 to 6, where the cracking product comprises ethylene, propylene, butenes, benzene, toluene, xylenes, ethylbenzene, H_2, methane, ethane, LPG, naphtha, gasoline, and gas oils.

8. The method of any of claims 1 to 7, where the cracking reactor is at least one catalyst bed reactor.

9. The method of claim 8, where the catalyst bed reactor includes a solid acid catalyst bed disposed in the catalyst bed reactor and the catalyst bed reactor is at a reaction temperature of 250 to 850 °C.

10. The method of claim 9, where the catalyst bed reactor comprises a fluidized bed reactor, a fixed-bed reactor, a slurry reactor, or a moving bed reactor.

11. The method of claim 10, where the catalyst bed reactor is a fixed bed reactor.

12. The method of claim 9, where the solid acid catalyst is a ZSM-5 catalyst having a Si/Al molar ratio of at least 10.

13. The method of claim 12, where the ZSM-5 catalyst comprises phosphorus, boron, nickel, iron, tungsten, or combinations thereof.

14. The method of any of claims 1 to 13, where the HGM stream and the hydrocarbon feed stream are fed at a weight ratio of 1:2 to 6:1.

15. The method of any of claims 1 to 14, where the hydrocarbon feed stream comprises non-fractioned or fractioned crude oil, hexane, naphtha, mixed butenes, ethylene, and combinations thereof.