

Cracking of petroleum vacuum residue with iron oxide catalyst using different hydrocarbon solvents

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Searching for economical ways of upgrading heavy oil is becoming increasingly important to the supply of fuel in future since the world's reserves of crude oil are tending toward heavier grades.

In this research, cracking of vacuum residue in a batch reactor with iron oxide was carried out using three different hydrocarbon solvents. The reactions were performed at 400°C with three kinds of gases under different partial pressure.

The effects of different solvents, gases and partial pressure on the level of conversion and coke formation as well as the distribution of oil products were investigated. An increase of partial pressure of gas led to the conversion improvement and coke reduction observed in most of the reactions. Tetralin showed the strongest ability of reduction of coke under all experimental conditions. The coke reduction was obviously observed with H₂ gas. In case of generating naphtha as a product, m-xylene was better than other solvents.