

Study of isooctane gasification in supercritical water at inclined tubular reactor

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Isooctane, a model compound for gasoline, was reformed to hydrogen using supercritical water as a novel reaction medium in continuous tubular reactor. Differs from other gasification experiments which was conducted in vertical or horizontal tubular reactor, in this study, the experiments were conducted in tubular reactor that was tilted to 14.5o from horizontal position to achieve good gas-liquid flow rate stability. Pressure was maintained constant at 25 Mpa. The effect of temperature, residence time, isooctane concentration and oxidant on carbon gasification efficiency (CGE), gasification efficiency (GE), and gas composition was investigated and the results are discussed in this paper. The produced gases consisted of hydrogen, methane and carbon dioxide as major composition, and carbon monoxide and C2-C4 species as minor composition. The results showed that high hydrogen gas yield, CE and CGE were achieved at high temperature, long residence time, low isooctane concentration and with an appropriate amount of the oxidant.