Gasification Characteristics of Petroleum Coke/Sand Mixture in a Fluidized Bed Reactor

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The upgrading technology of heavy oils and residue can classified into three processes, which are hydroprocessing, thermal process (carbon rejection process), and gasification. The extra-heavy oil fractions upgrading process, which consists of a rapid thermal pyroylzer (RTP) of extra-heavy oil and gasifier of RTP residue to produce syngas as well as supply heat to the pyrolyzer are developed in KIER (Korea Institute of Energy Research). For the RTP residue (petroleum coke) gasifier design, parameters such as reactor temperature, residence time, ER(Equivalence Ratio), Steam/fuel ratio and gas velocity in the gasifier should be determined.

In this study, the continuous fluidized bed reactor having capacity of 10kg/h (0.05 m I.D. x 1.2 m high) was designed and constructed for petroleum coke/sand gasification. The air and steam were used as gasifying agents. The gasification performances such as product gas composition, carbon conversion, gas yield, heating value of product gas are determined.