

Interactive Matching between the Temperature Profile and Secondary Reactions of Oil Shale Pyrolysis - DTU Orbit (09/11/2017)

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This article investigates the effect of the reactor temperature profile on the distribution and characteristics of the products from fixed-bed pyrolysis of oil shale. Experiments were performed in a one-stage fixed-bed reactor and in a two-stage fixed-bed reactor. In the one-stage reactor, the shale oil yield reached 7.40 wt % with a reactor temperature profile from 900 to 550 degrees C and decreased to 2.23 wt % with the reverse temperature profile. The effect of the temperature profile was investigated further in the two-stage fixed-bed reactor combining a pyrolysis stage operating at 550 degrees C and a shale char bed operating at different temperatures. At low temperatures (550 degrees C), severe cracking occurred, converting both heavy and light oil to carbon and gas. The desirably matched reactor temperature profile for high oil yield is discussed via analysis of the tendency of secondary reactions subject to the temperature of particles contacting primary volatiles.

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