

Batch combustion of oil shale particles in a fluidized bed reactor

Abstract

Batch charges of Jordanian oil shales were burnt in a laboratory scale fluidized bed of sand. The effect of shale particle size, initial bed temperature, superficial gas velocity, sand size, and batch weight on the burnout time was investigated. Visual observation of shale burnout time, on-line CO₂ concentrations in flue gas and bed temperature variation were measured simultaneously during the combustion process. The results have shown, in general, that an increase in bed temperature or superficial gas velocity was associated with a decrease in burnout time. On the contrary, an increase in particle mean size led to an increase in burnout time. The burnout time was analyzed based on the shrinking-core model, and the results indicated that chemical kinetics, rather than diffusion, significantly influenced the combustion process