

Application of Bayesian Filters and Thermogravimetry Analysis to Determine the Kinetics of Oil Shale Pyrolysis

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ABSTRACT

Smoldering combustion is a slow, low-temperature flameless combustion, sustained by the heat that is released when oxygen directly attacks the surface of a condensed-phase fuel. This heat propagates through a porous fuel matrix, and involves complex processes related to fluid flow, heat transfer, and heterogeneous chemical reactions in porous media. Studies about thermochemical processes of unconventional fuels are being conducted to evaluate its potential energy. This study aims to estimate the Arrhenius parameters for oil shale combustion and pyrolysis in a porous bed. Kinetic parameters were estimated by applying Bayesian filters to a state estimation problem [2] involving a differential equations system solution with the help of thermogravimetric analysis. It was possible to obtain good estimated results evaluating the mass variation compared with the DTG curve.

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