

عنوان مقاله:

A Kinetic Investigation into the In Situ Combustion Reactions of Iranian Heavy Oil from Kuh-E-Mond Reservoir

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خلاصه مقاله:

An efficient design of in situ combustion depends on accurate kinetic modeling of the crude oil oxidation. The kinetic triplet of the oxidation reactions of a heavy oil sample was investigated. Once the kinetic triplet is known, the kinetic equation would be deconvolved. The crude oil sample was obtained from Kuh-E-Mond reservoir, located in the southwest of Iran. The samples were analyzed using differential scanning calorimetry (DSC) at atmospheric pressure, in a temperature range of 297-973 K, and at four different heating rates. Three isoconversional kinetic models were used to obtain a variation of Arrhenius parameters during the course of the high temperature oxidation reaction. The activation energy (E_a) and the pre-exponential factor (A) were obtained at different conversions. Having Arrhenius parameters, the conversion function, $f(\alpha)$, was estimated using an advanced master plot method. It was observed that $f(\alpha)$ follows the Avrami–Erofeev (A_n) model with $n=3$. Furthermore, the parameters of truncated Sestak–Berggren (SB) reaction model were obtained. SB fits fairly better than A_3 to the experimental data. According to the results, a change in the heating rate does not considerably vary the reaction model.

کلمات کلیدی:

In Situ Combustion, DSC, Kinetic Triplet, Isoconversional Model, Reaction Model

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