عنوان مقاله:

Population Balance Modeling of Asphaltene Aggregation; A Fractal Dimension Sensitivity Analysis

محل انتشار:

سومین کنفرانس بین المللی فناوری های جدید در صنایع نفت، گاز و پتروشیمی (سال: 1400)

تعداد صفحات اصل مقاله: 6

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خلاصه مقاله:

The present study employed a population balance model to predict particle size distributionchanges over time in a dead light crude oil. The developed model was validated using a set of particlesize distribution data at different temperatures and the modeling results clarified the effect oftemperature on the kinetic parameters. Since the system was under static conditions, only the Brownianaggregation kernel of Smoluchowski was incorporated into the model and collision efficiency wasadjusted for different temperatures and fractal dimensions. A sensitivity analysis was performed fordifferent fractal dimensions reported in the literature. The results revealed a rising trend for collisionefficiency with temperature. Additionally, the adjusted values for collision efficiency were stronglydependent on fractal dimension while a reverse trend was found between Collision efficiency and fractaldimension. The more the temperature was, the more the results were affected by changing the insertedfractal dimension. The modeling results created an average root-mean-square-error (RMSE) of ۹.۶%.Despite the collision efficiency dependence on the fractal dimension, the predicted particle sizes wereless sensitive to the applied value of the fractal dimension.

کلمات کلیدی:

Asphaltene, Aggregation, Population balance modeling, Fractal dimension, Collision efficiency