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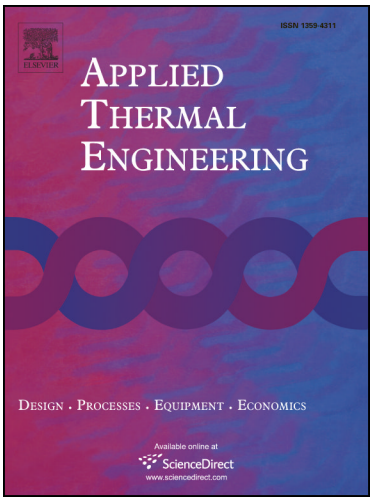

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Complex Crude Oil Fouling Layers: Use of Model Predictions to Detect Inorganics Breakthrough

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ABSTRACT

Crude oil fouling models have greatly improved in the past two decades. However, most models focus on the deposition of organic species at high temperatures (i.e. greater than 200 °C). In this paper, a deposit model, capable of capturing simultaneously the deposition of both organic and inorganic species, is used to track deposition history in a shell-and-tube heat exchanger at the hot end of a refinery pre-heat train. The model was previously fitted to plant data and the results compared to the experimental characterization of deposits. It is shown that such a model, together with plant data, can be used i) to describe the development of complex deposit layers; ii) to detect and diagnose changes in composition of the deposit. From a practical perspective, it is then possible to alert plant operators of unexpected events such as breakthrough of inorganics at an early stage and help in planning corrective actions.

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