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# Mutual effects of sara fractions on the oxidation behavior characterized by differential scanning calorimeter (DSC)

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## Abstract

© SGEM2018. In-situ combustion process has been proven to be an effective enhanced oil recovery (EOR) method for heavy oils. However, until now, the in-situ combustion is still not widely used as steam injection is. The main reason that limits the wide application of in-situ combustion process is the unclear understanding of its complicated combustion and displacement process that is mainly controlled by the oxidation of crude oil. The complicated composition of crude oil makes it difficult to understand the oxidation mechanism. Therefore, in this study, the crude oil was divided into four SARA fractions. And their oxidation behavior was investigated by DSC experiments. This work is focused on their mutual effects during the oxidation behavior, which is very important to better understand the oxidation mechanism. The results showed that the presence of aromatic fractions had a strong inhibition effect on the oxidation of saturates. It turned the reaction interval of saturates into higher temperature ranges. However, resins had a smaller effect on the low-temperature oxidation (LTO) of saturates compared with the aromatics, and asphaltenes had a very small effect on the LTO of saturates. The inhibition effect of aromatics, resins and asphaltenes on the LTO of saturates in turns are: aromatics > resins > asphaltenes. However, the presence of resin and asphaltenes can significantly improve the high-temperature oxidation (HTO) of the saturates.

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## Keywords

Crude oil, In-situ combustion, Mutual effects, Oxidation behavior, SARA fractions

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