

## Investigation of Asphaltene Precipitation and Deposition in Baffled Oil-bearing Carbonate Formations

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Tar mat phenomenon has been recognized in oil reservoirs world wide. They are non-producible petroleum zones within a reservoir that are sharply enriched in asphaltenes with respect to the overlying oil column. Understanding the origin and distribution of tar mats in oil reservoirs is vital for enhancing and optimizing the overall field development and EOR programs. Asphaltene precipitation in oil reservoirs can be induced by phase changes resulting from the effect of gravitational compositional gradients and/or gas influx into the reservoirs, which lead to the deposition of asphaltenes (dropping out of solution) and formation of tar mats, in extreme cases [1,2]. Although there are several studies that describe, characterize and model tar mats [1,2,3,4], the dynamics of asphaltene precipitation near the bottom of thick carbonate reservoirs with intra-reservoir baffles are still not well understood.

In this work, we study an oil-bearing carbonate formation with large asphaltene and oil viscosity gradients. The goal was to conduct a detailed geochemical characterization of polar and non-polar species of these heavy oils combined with rock properties and PVT data to gain insight into the process of asphaltene phase behaviour and tar mat formation in heterogeneous baffled carbonate reservoirs.

[1] Wilhelms A. & Larter S.R. (1994) *Mar. Pet. Geol.*, **11(4)**, 442-45. [2] Wilhelms A. & Larter S.R. (1995) *Geol. Soc. London Spec. Publ.*, **86(1)**, 87-101. [3] Hirschberg A. (1984) *Soc. Petrol Engin. AIME*, SPE Pap. No. 13171. [4] Mullins et al. (2012) *Energy Fuels*, **27(4)**, 1752-176.