Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Numerical Simulation of Crude-Oil Fouling with the Volume-of-Fluid Method[1] GABRIEL GONCALVES, Imperial College London, MIRCO MAGNINI, University of Nottingham, OMAR MATAR, Imperial College London — In oil production or processing pipelines, the change in themodynamical conditions may cause components of crude-oil to precipitate and adhere to the wall, leading to undesired changes in the hydaulic and thermal performance of the system over time. Although significant progress has been achieved in understanding qualitatively the main mechanisms of wax formation and removal, quantitative comparisons with experimental data are still heavily dependent on calibration to experimental data. In order to perform high-fidelity simulations in arbitrary geometries, a two-phase multi-component solver with heat transfer and phase change was implemented in the OpenFOAM open-source framework. The volume-of-fluid method is used for tracking the interface between fouling layer and liquid phase. The implementation was compared with previous calculations performed in a commercial CFD platform and preliminarily validated with experimental data from the literature.

[1]CNPq funding for GG, and PETRONAS/Royal Academy of Engineering Research Chair for OKM is gratefully acknowledged.

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Date submitted: 29 Jul 2019 Electronic form version 1.4