Kinetic modelling of methane hydrate formation and agglomeration with and without anti-agglomerants from emulsion in pipelines

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Abstract

Offshore systems mainly containing crude oil, natural gas and water operate at low temperature and high pressure which favour conditions for gas hydrate formation and agglomeration. Gas hydrate is a serious issue in flow assurance; it may cause many troubles, especially, plugging in oil and gas pipeline. This work is to intend to develop a kinetic model to predict gas hydrate formation, agglomeration and plugging in flowlines based on the experimental data obtained from Archimede Flowloop from the work of Mendes-Melchuna (2015). In this model, the mean droplet size of emulsion will be calculated from flow parameters to evaluate the surface area of droplets which are very critical parameters for kinetic model of gas hydrate formation in emulsion. It is important to note that anti-agglomerants (AAs) may modify the water-oil interfacial tension leading to smaller mean droplet size. A preliminary study of the emulsion formation and behaviour will contribute to a better understanding of the hydrates formation and agglomeration.

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