

# CRYSTALLIZATION OF METHANE HYDRATES FROM AN EMULSION IN A FLOWLOOP: EXPERIMENTS IN A GAS-LIQUID-LIQUID SYSTEM IN THE GAS-LIFT

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## Abstract

Production of crude oil with natural gas and water at low temperature and high pressure favours conditions for gas hydrate formation. Gas hydrate is a major concern for flow assurance in pipelines; it may cause many troubles, up to blockage of oil and gas pipelines. This work deals with mechanism of methane hydrate crystallization, agglomeration together with slurry transport and deposition on pipes wall. The liquid-liquid system is composed by Kerdane and water under flowing conditions. The experiments were performed in "Archimede Flow loop" (at 80 bar, 4°C) equipped with a FBRM (Focused Beam Reflectance Measurement) probe, PVM (Particle Video Microscope) probe, pressure drop measurements, density and flow meters. The flow is induced by the gas-lift and a volumetric pump (Moineau pump). The gas-lift is similar to a bubble column where gas is injected in the liquid-liquid system. The hydrate volume fraction, the gas transfer and the viscosity are evaluated from measurements. The experiments were done by varying: commercial anti-agglomerant low dosage hydrate inhibitor (AA-LDHI), water volume fraction, and water salinity. A preliminary investigation on the mean droplet size of the liquid-liquid dispersion will contribute to a better understanding in mechanism and kinetics of the hydrates formation, agglomeration, deposition and plugging in oil and gas flowlines. A conceptual model describing the hydrate crystallization, agglomeration and slurry transport and deposition under flowing through our flow loop is developed. The model will consider two different cases with high and low water cut.