Experimental Evaluation of Kinetic Inhibitors for Hydrocarbon Hydrates

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The thermodynamic evaluation of chemical compounds that can act as kinetic inhibitors for hydrocarbon hydrates is of the utmost importance to develop better inhibitors to be applied in the oil and gas industries in a wide range of pressure and temperature, mainly for the assurance of flow in production and process pipes. In this work a high-pressure apparatus and experimental method are presented to evaluate commercially available chemical compounds. A cylindrical stainless steal high-pressure cell of 20 cm^3 with two sapphire windows is the main piece of experimental setup. The thermometer and pressure transducer are connected to a data logger and a personal computer to record the temperature and pressure as function of time for the systems water + methane + inhibitor and water + natural gas + inhibitor. Aqueous solutions of different polymeric commercial products based on vinylcaprolactam, vinylpyrrolidone, dimethylaminoethyl methacrylate, and dimethylamino-propyl-methacrylamide were prepared with 0.5 mass % concentration. Methane and natural gas were used independently as hydrate-forming gas. Hydrate formation rates for all the tests were determined to establish the best kinetic inhibitors.