Gas hydrate inhibition for flow assurance applications

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Despite a worldwide attention to gas hydrates as clean energy sources and their environmental implications, the principle of hydrate inhibition phenomenon, controlling hydrate formation and dissociation, is not well understood yet. In the present work, some naturally occurring molecules, which are promising kinetic hydrate inhibitors (KHIs) due to their amphiphilicity in water, were used as a model system to investigate the inhibition mechanism of gas hydrate nucleation and growth. Using macroscopic measurements and synchrotron X-ray diffraction, their abilities to inhibit CO2 hydrate nucleation and growth were measured at 0.01–1.0 mol% concentration. A fundamental understanding of the hydrate inhibition phenomenon gained from this work will help to develop more efficient KHIs.