IMPROVING THE PERFORMANCE OF KINETIC HYDRATE INHIBITORS

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ABSTRACT

Addition of small amounts of certain compounds to kinetic hydrate inhibitor (KHI) solutions is one way to enhance the performance of KHIs. The most studied KHI enhancer, polyethylene oxide (PEO), has been found to improve the KHI performance by an order of magnitude. The effect of PEO on KHIs may be analogues to how citric acid enhances the antifreeze activity of ice-structuring proteins (ISPs). ISPs are mainly known for protecting certain species living in cold environments from fatal interior ice formation but they also work quite well as KHIs. Contrary KHIs do not influence the formation of ice. By comparing how these enhancers affect the capability of KHIs and ISPs to prevent gas hydrate formation it is possible to assess which enhancer type is more suitable for hydrate inhibition. While little is known about how the enhancers actually work such a comparison study may also provide information about the enhancer mechanism.

In this work we investigate the effect of a commercial KHI (Luvicap) and an ISP (ocean pout) on the induction time of natural gas hydrate. The effect of two different molecular weight PEOs, citric acid and an aminopolycarboxylic acid on the induction time has been determined and their enhancer capacity for both the KHI and the ISP was quantified.

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