



Experimental investigation of induction time for binary mixtures during gas hydrate formation in the simultaneous presence of the PVP and L-Tyrosine as kinetic inhibitors in a flow mini-loop apparatus

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Abstract

The main objective of the present work is experimental investigation of induction time for double gas hydrate formation in presence or absence of kinetic inhibitors in a flow mini-loop apparatus. For this purpose, a laboratory flow mini-loop apparatus was set up to measure the induction time for hydrate formation when a gaseous mixture (such as 70% C1-30% C3, 30%C1-70% C3, 70%C1-30% i-C4 and 30%C1-70% i-C4) is contacted with water in the absence or presence of dissolved inhibitor under suitable temperature and pressure conditions. In this work, induction time is investigated for of double gas hydrate formation in vitro in the simultaneous presence of the PVP and L-Tyrosine alone and their simultaneous presence as kinetic inhibitors in a flow mini-loop apparatus at various concentrations. The results show that the simultaneously addition of PVP and L-tyrosine increases the induction time of gas hydrate formation several time more than that without using the inhibitor. Indeed, the addition of small value of L-tyrosine to PVP, the induction time being longer than when PVP is as a kinetic inhibitor only, because the L-tyrosine is stronger than the PVP as an inhibitor.

Keywords: Induction time, double gas hydrate formation, kinetic inhibitor, PVP, L-tyrosine

Research Highlights

Measuring the induction time for binary gaseous mixtures during gas hydrate formation ₄ Simultaneous presence of PVP & L-tyrosine as a KHI (new KHI) Experimental investigation is in a flow mini-loop apparatus