

Synergistic Kinetic Inhibition of Methane Hydrate Formation Using Amino Acids and Ionic Liquids Mixtures

이동영, 서용원[†], 고우진
울산과학기술원
(ywseo@unist.ac.kr[†])

Gas hydrates are often considered as a main factor of pipeline plugging during gas and oil production and transportation. Therefore, it is required to develop promising hydrate inhibitors and to reveal the accurate inhibition mechanism for prevention of plugging risks in oil and gas pipelines. In this study, we used mixtures of dual function inhibitors and two different reactor types to elucidate synergism of each mixture combination and to confirm the difference in experimental results caused by mixing. The temperature ramping method was used for both experimental reactor types to measure the accurate onset temperature of gas hydrate formation. The differential scanning calorimeter (DSC) results showed that glycine + [BMIM][BF₄] gave the lowest onset temperature and the lowest dissociation enthalpy (ΔH_d) value after hydrate formation, indicating the best kinetic inhibition performance without mixing in this study. The autoclave results were generally consistent with the DSC results. These experimental results will provide a better understanding of kinetic hydrate inhibition mechanism regarding the synergism of hydrate inhibitors.