

Correlations between physicochemical properties of amino acids and their performances in inhibiting CO₂ hydrate formation

사정훈, 광계훈, 이건홍*
포항공과대학교
(ce20047@postech.ac.kr*)

To avoid pipeline blockages in gas transmission lines, hydrate inhibition has been paying much attention due to its economic significance. In response, injection of kinetic hydrate inhibitors is a promising technology. Despite a great deal of efforts, their inhibition mechanism is still not revealed yet. In this work, hydrophobic amino acids (glycine, L-alanine, L-valine, L-leucine, L-isoleucine) at 0.01 to 1.0 mol% dosage were used as a model system to investigate their kinetic inhibition mechanism on carbon dioxide hydrate formation and their inhibition performances were correlated with physicochemical properties. Nucleation and growth kinetics were observed by macroscopic measurements in the temperature range of 260 to 285 K and the maximum operating pressure of 36 bar. Also, high-resolution powder diffraction analysis was performed at 80 K under atmospheric pressure. From the correlations between molecular properties of hydrophobic amino acids and their inhibiting performances, this work can provide an insight into the kinetic inhibition mechanism.