Pyrrolidinium cation-based ionic liquids: New inhibitors for hydrate

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The performance of ionic liquids (ILs) as a new class of gas hydrate inhibitors has been investigated. It is found that pyrrolidinium cation-based ILs have good inhibition effects. [HEMP][BF4] as IL hydrate inhibitor had long induction time of 61.5 min at 0.1 wt%. The induction time of [HEMP][BF4] was very long time when it was compare with those of classic kinetic hydrate inhibitors such as PVP(0.4min, 0.1 wt%), PVCap (11.7min, 0.1 wt%). Because of their strong electronic charge and hydrogen-bond with water, ILs could shift hydrate equilibrium line to a lower temperature at a pressure. It is noticeable that they also delay the methane hydrate formation. Thus, ILs have both thermodynamic and kinetic inhibition effect.