N-butyl-N-methylpyrrolidinium tetrafluoroborate and 1-ethyl-3-methylimidazolium tetrafluoroborate as dual function inhibitors for methane hydrate

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The formerly announced several immidazolium-based ionic liquids (ILs) were introduced as dual function inhibitors that not only shift the equilibrium dissociation/stability curve to a lower temperature but also slow down the induction time on gas hydrate formation. In this study, we treated the inhibition effect of pyrrolidinium-based ionic liquids as hydrate inhibitors. we have prepared N-butyl-N-methylpyrrolidinium tetrafluoroborate ([BMP][BF_4]) and 1-ethyl-3-methylimidazolium tetrafluoroborate ([EMIM][BF_4]). Eqiilibrium line and induction times for hydrate formation were measured. When [BMP][BF_4] was applied, hydrate-aqueous liquid-vapor (HLV) equilibrium temperature was shifted by 1.3-1.6K and the induction time was about 4hours and 20minutes. The overall results indicated [BMP][BF_4] could perform better in blocking gas hydrate formation compared to [EMIM][BF_4].