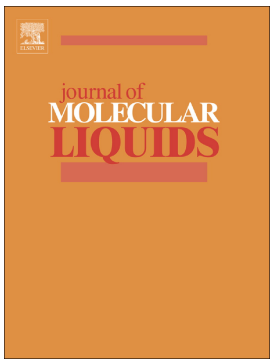

Study on absorption and spectral properties of H2S in carboxylate protic ionic liquids with low viscosity

Tianxiang Zhao, Ping Li, Xi Feng, Xingbang Hu, Youting Wu

PII: S0167-7322(18)31965-2
DOI: doi:10.1016/j.molliq.2018.07.011
Reference: MOLLIQ 9332

To appear in: *Journal of Molecular Liquids*

Received date: 13 April 2018
Revised date: 2 July 2018
Accepted date: 3 July 2018

Please cite this article as: Tianxiang Zhao, Ping Li, Xi Feng, Xingbang Hu, Youting Wu , Study on absorption and spectral properties of H2S in carboxylate protic ionic liquids with low viscosity. Molliq (2018), doi:10.1016/j.molliq.2018.07.011

Study on absorption and spectral properties of H_2S in carboxylate protic ionic liquids with low viscosity

Tianxiang Zhao, Ping Li, Xi Feng, Xingbang Hu and Youting Wu**

School of Chemistry and Chemical Engineering, Separation Engineering Research Center, Key Laboratory of Mesoscopic Chemistry of MOE, Nanjing University, Nanjing 210093 (P. R. China). Corresponding author. E-mail: huxb@nju.edu.cn (X. Hu); ytwu@nju.edu.cn (Y. Wu)

ABSTRACT. The exorbitant price and high viscosity are two major disadvantages for ionic liquids (ILs), which influence their practical applications in gas separation. Here we synthesized ten carboxylate protic ionic liquids (PILs), containing *N*-ethylmorpholine acetate, *N*-ethylmorpholine propionate, *N*-ethylmorpholine butyrate, *N*-ethylmorpholine methoxylacetate, 4-(2-hydroxyethyl) morpholine acetate, and 4-(2-hydroxyethyl) morpholine methoxyacetate, triethylamine acetate, triethylamine propionate, triethylamine propionate, and triethylamine methoxylacetate, with low cost and viscosity for absorption of H_2S. The densities and viscosities of these carboxylate PILs were measured in the temperature range of (298.2 to 333.2) K at atmospheric pressure. The solubility of H_2S in these PILs was determined using an isochoric saturation technique at 298.2 ~ 318.2 K and 0 ~ 1.096 bar. It was found that the solubility of H_2S in these PILs increased with the increasing pressure and length of the alkyl chains on the carboxylic acid. The absorption processes obeyed Henry's law within the given experimental conditions and Henry's constants were calculated from solubility data. In addition, the FTIR and