

N°383 / PC

TOPIC(s) : Chemical engineering / Alternative solvents

Exploration of the effect of different additives on the absorption of carbon dioxide from amino functional ionic liquids

AUTHORS

Shang-Hao LIU / ANHUI UNIVERSITY OF SCIENCE AND TECHNOLOGY, 168 TAIFENG STREET, HUAINAN, ANHUI, CHINA, HUAINAN

Bin ZHANG / ANHUI UNIVERSITY OF SCIENCE AND TECHNOLOGY, 168 TAIFENG STREET, HUAINAN, ANHUI, CHINA, HUAINAN

Cheng-Tao FENG / ANHUI UNIVERSITY OF SCIENCE AND TECHNOLOGY, 168 TAIFENG STREET, HUAINAN, ANHUI, CHINA, HUAINAN

PURPOSE OF THE ABSTRACT

In essence, ionic liquids (ILs) are salts with melting points at or below 100 °C, which are composed of organic cations and organic or inorganic anions. Owing to their distinctive properties, such as low melting point, wide liquid range, extremely low vapor pressure, sound thermal stability and wide electrochemical windows etc., ILs are used in a number of application areas

In gas absorption, especially in carbon dioxide (CO₂) capture, ionic liquids (ILs) have shown potential applications. Amino functional ILs have attractive properties, such as superior CO₂ solubility, negligible volatility, and remarkable thermal stability. They can be designed for task-specific applications through a smart choice of the respective cations and anions. As the research progress of ILs, we found that the dual functional IL absorption rate of CO₂ could achieve above 1:2. However, due to the amino acid functional groups, the system led to absorbing CO₂ liquid viscosity increasing. Some recent studies have found that when ILs are added to water and other additives, they can reduce the viscosity after absorbing CO₂. The effects of some other substances on the absorption of CO₂ viscosity were studied. The main IL used in this paper was tetraethylammonium glycine ([N2222][Gly]; C₁₀H₂₄N₂O₂), tetraethylammonium l-proline ([N2222][L-Pro]; C₁₃H₂₈N₂O₂) Tetraethylammonium l-alanine ([N2222][L-Ala]; C₁₁H₂₆N₂O₂), and the Fourier infrared spectrum mainly explored the changes of the structure after the IL absorbed the CO₂, and the viscometer mainly tested the viscosity changes before and after the ILs of different additives.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

Ionic liquid | CO₂ capture | Additive | Viscosity

BIBLIOGRAPHY

- [1] K. Dong, X. Liu, H. Dong, X. Zhang, S. Zhang, *Chem. Rev.* 2017, 117, 6636–6695.
- [2] R.A. Sheldon, *Chem. Soc. Rev.* 2012, 41, 1437–1451.
- [3] G.H. Hong, J.H. Oh, D. Ji, S.W. Kang, *Chem. Eng. J.* 252 (2014) 263–266.
- [4] M.C. Kroon, W. Buijs, C.J. Peters, G.J. Witkamp, *Green Chem.* 2006, 8, 241–245.
- [5] S. Raeissi, C.J. Peters, *Green Chem.* 2009, 11, 185–192.
- [6] B. Sasikumar, G. Arthanareeswaran, A.F. Ismail, *J. Mol. Liq.* 2018, 266,330–341.