

Additions and Corrections

CHEMISTRY LETTERS, pp 1590–1591, 2004

Discovery of a Magnetic Ionic Liquid [bmim]FeCl₄

Satoshi Hayashi and Hiro-o Hamaguchi*

Department of Chemistry, School of Science, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033

In a previous paper entitled “Discovery of a Magnetic Ionic Liquid [bmim]FeCl₄”,¹ we reported the preparation and characterization of a “magnetic” ionic liquid, 1-butyl-3-methylimidazolium tetrachloroferrate [bmim]FeCl₄, which was shown to respond strongly to a magnet. We also noted that the compound was “paramagnetic” according to the observed temperature dependence of magnetic susceptibility. Both “magnetic” and “paramagnetic” were used in the paper causing some confusion.

The term “magnetic fluid” is well established and used extensively, meaning a fluid that responds strongly to a magnet.² In our paper,¹ we used “magnetic” in the same sense as that used for “magnetic fluid”. Magnetic fluids consist of ferromagnetic nanoparticles dispersed in carrier liquids.² They are neither “paramagnetic” nor “ferromagnetic” because the spin ordering exists only locally within the particles. They are often called “superparamagnetic.” The same situation may hold in the case of ionic liquids, for which the possibility of local ordering of component ions has been suggested.^{3–5} We therefore restate here that “[bmim]FeCl₄ showed paramagnetic-like temperature dependence of magnetic susceptibility,” in order to allow the possibility that it is not actually paramagnetic.

We would also like to add that several room-temperature ionic liquids containing Fe³⁺ are already known.^{6–10} These ionic liquids are thought to respond, more or less, to a magnet.

We are grateful to the Editor, Professor Tamejiro Hiyama, for his kindly suggesting us to write this correction.

References

- 1 S. Hayashi and H. Hamaguchi, *Chem. Lett.*, **33**, 1590 (2004).
- 2 “Functional fluids and intelligent fluids (in Japanese),” The Japan Society of Mechanical Engineers, Corona Publishing (2000), pp 11–47.
- 3 S. Hayashi, R. Ozawa, and H. Hamaguchi, *Chem. Lett.*, **32**, 498 (2003).
- 4 R. Ozawa, S. Hayashi, S. Saha, A. Kobayashi, and H. Hamaguchi, *Chem. Lett.*, **32**, 948 (2003).
- 5 H. Katayanagi, S. Hayashi, H. Hamaguchi, and K. Nishikawa, *Chem. Phys. Lett.*, **392**, 460 (2004).
- 6 M. S. Sitze, E. R. Schreiter, E. V. Patterson, and R. G. Freeman, *Inorg. Chem.*, **40**, 2298 (2001).
- 7 Y. Katayama, I. Konishiike, T. Miura, and T. Kishi, *J. Power Sources*, **109**, 327 (2002).
- 8 G. Saito, in “Ionic Liquids: The front and future of material development (in Japanese),” ed. by H. Ohno, CMC Press (2002), p 142.
- 9 J.-Z. Yang, W.-G. Xu, Q.-G. Zhang, Y. Jin, and Z.-H. Zhang, *J. Chem. Thermodyn.*, **35**, 1855 (2003).
- 10 W. Xu, E. I. Cooper, and C. A. Angell, *J. Phys. Chem. B*, **107**, 6170 (2003).