

Synthesis of $[\text{Fe}(\text{CN})_6]^{4-}$ in ionic liquid: a new precursor for preparation of iron nanoparticles

Mohammad Kaikhosravi, Mohammad-Taghi Behnamfar, Fatemeh Davar, Marzieh Daryanavard, Hassan Hadadzadeh*

Department of Chemistry, Isfahan University of Technology, Isfahan, Iran (e-mail: hadad@cc.iut.ac.ir)

Ionic Liquids (ILs) are a class of salts which are liquid at ambient conditions. These materials have the specific physical properties such as low vapor pressure, electric conductivity, interesting solvent properties, biphasic systems possible, liquid crystalline structures, high electroelasticity, high heat capacity, non-flammability, the low interface tension and the associated high nucleation rate as well as high thermal stability [1]. These unique properties make ILs attractive for scientists in a variety of field, especially those studying nanocrystals of inorganic materials [2-3]. In this report, at first $(\text{BMIM})_4[\text{Fe}(\text{CN})_6]$, where BMIM is 1-butyl-3-methylimidazolium, has been synthesized using $(\text{BMIM})(\text{PF}_6)$ ionic liquid (Fig. 1). Then the Fe nanoparticles were prepared by the solvothermal method through varying the growth temperature and time. The formation of Fe nanoparticles was confirmed by x-ray diffraction (XRD) and the average particle size has been found to be about 27 nm. Also, the composition of the products was investigated by inductively coupled plasma atomic emission spectroscopy (ICP-AES).

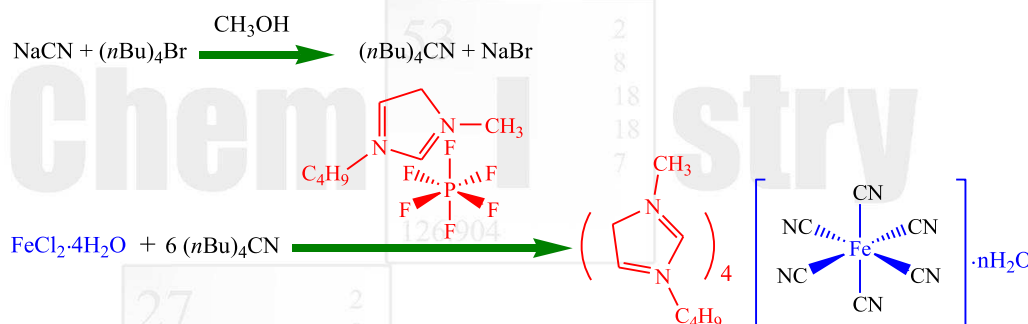


Fig. 1. Synthesis route of $(\text{BMIM})_4[\text{Fe}(\text{CN})_6] \cdot n\text{H}_2\text{O}$.

References:

- [1] J. D. Holbrey, K. R. Seddon, *Clean Technol. Environ. Policy* (1999) 223.
- [2] C. Burda, X. Chen, R. Narayanan, M. El-Sayed, *Chem. Rev.* 105 (2005) 1025.
- [3] M. Antonietti, D. Kuang, B. Smarsly, Y. Zhou, *Angew. Chem. Int. Ed.* 43 (2004) 4988.