

CoFe₂O₄/ polyaniline nanocomposite as an efficient adsorbent for Ni²⁺ and Cu²⁺

M. Kooti*, M. Mehrkhah, S. Gharineh

Department of Chemistry, Shahid Chamran University, Ahvaz 61357- 43169, Iran

The need for combining of the magnetic with the conductive properties leads to processing of new materials such as conductive polymers with magnetic behavior or vice versa. Such new materials have attracted a lot of attention due to their unique properties and wide applications. The most common procedure to combine the magnetic properties with the conductive properties is to coat a superparamagnetic material with a conducting polymer. Among the heterogeneous conducting polymers, polyaniline (PANI) is the most extensively studied, due to its interesting properties. On the other hand spinel ferrites with common formula of MFe₂O₄ are more frequently used as the magnetic core.

Hence, we have used CoFe₂O₄ as a core and coated it with polyaniline to prepare CoFe₂O₄@PANI nanocomposite with core/shell structure. Coating was achieved by in-situ oxidative polymerization of aniline. The as-prepared CoFe₂O₄@PANI composite was characterized by FT-IR, XRD and other techniques. This nanocomposite was used as adsorbent for nickel and Copper pollutants from aqueous solution. This study has revealed that both of these cations could be efficiently removed from solution. Moreover, the adsorbent can be easily removed from the solution media by applying of an external magnetic field.

References:

- [1] C. Wang et al, *Mat. Sci. Semicon. Proc.* 16 (2013) 77-82.
- [2] M. Abdullah Dar et al, *J. Phys. Chem. C*, 116 (2012) 5277-5287.
- [3] C. Cui et al, *J. Phys. Chem. B* 116 (2012) 9523-9531.
- [4] M. Ayad, G. El-Hefnawy, S. Zaghlool, *Chem. Eng. J.* 217 (2013) 460-465.