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Surface and porous properties of polynaphthylamine/Fe₃O₄ composite and the arsenic adsorption capacity in wastewater

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The research results of the polynaphthylamine (PNA)/Fe₃O₄ nanocomposites synthesized by a chemical method for As(III) wastewater treatment are presented in this paper. The X-ray diffraction patterns and transmission electron microscopy images showed that samples had the shell-core structure with the grain sizes varied from 13 nm to 22 nm. The results of vibrating sample magnetometer measurements at room temperature showed that saturation magnetic moments of PNA/Fe₃O₄ samples decreased from 63.13 emu/g to 43.43 emu/g with the increase of PNA concentration from 5% to 15%. The nitrogen adsorption-desorption isotherm of samples at 77 K was studied in order to investigate the surface and porous structure of nanoparticles by BET method. The pore size distribution of about 15–20 nm was calculated by the BJH (Barrett, Joyner, and Halendar) method at a relative pressure P/P₀ of about 1. Although the saturation magnetic moments of samples decreased when the increase of polymer concentration, but the arsenic adsorption capacity of PNA/Fe₃O₄ sample is better than that of Fe₃O₄ nanoparticles in a solution with pH=7. In the solution with a pH>14, the arsenic adsorption of magnetic nanoparticles is insignificant.

Biography

Tran Minh Thi is holding a Past administrative position: Head of General Physics Department; Vice dean of Faculty of Physics.

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