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COMPARISON OF SOME NON-CONVENTIONAL SORBENTS FOR THE REMOVAL OF ARSENIC FROM WATERS

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Abstract

Iron humate (IH) produced as a waste by-product during the industrial manufacture of humic substances from young brown coal was tested as a new cost-effective sorbent for the removal of inorganic arsenic from waters. Its removal efficiency was compared with that of two other non-conventional sorbents – magnetite and oxihumolite (weathered brown coal). Magnetite and IH have been found to be effective in removing both forms of inorganic arsenic (arsenite and arsenate) from aqueous solutions. The removal efficiency was only slightly affected by the pH value in an acidic to neutral working pH range of the sorbents. It was found that the arsenic removal with the aid of IH is a rather slow process requiring several days to attain equilibrium; however it is much more rapid (with equilibrating times not exceeding four hours) with magnetite and oxihumolite. The examined sorbents were successfully applied to the removal of arsenic from real groundwater heavily contaminated by arsenic leaching from mine tailings. The low-cost sorbents in combination with the commonly employed oxidation/precipitation processes could enhance the overall efficiency of arsenic removal from contaminated effluents by approximately 10-30 %.

Key words: arsenic removal, iron humate, magnetic sorbent, sorption, wastewater treatment

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