Regeneration of acid-modified activated carbon used for removal of toxic metal hexavalent chromium from aqueous solution by electro kinetic process

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ABSTRACT

Hexavalent chromium Cr(VI) is toxic and readily adsorbed by some adsorbents; therefore, its removal from wastewater is extremely important. Granular activated carbon (GAC) is a well-known adsorbent for the removal of heavy metals from water and wastewater. It has been found that removal rates of Cr(VI) by acid-modified-activated carbon decreases over time and the permeable reactive barriers become almost inefficient. This study aims to investigate the regeneration performance of activated carbon by electrokinetic (EK) process under potential gradient of 5 V cm$^{-1}$, electrical current of 30–50 mA, and elapsed time of 8 and 24 h. About 95% regeneration efficiency of activated carbon was achieved by an EK system with electrical current of 30–50 mA operated for 24 h, so GAC was successfully regenerated. Also it was shown that only about 80% of regeneration efficiency was achieved by applying EK for 8 h.

Keywords: Permeable reactive barriers; Polluted groundwater; Hexavalent chromium; Granular activated carbon; Electrokinetic process; Regeneration

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