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Removal of Cr(VI) from wastewater by supported nanoscale zero-valent iron on granular activated carbon

Fenglian Fu*, Weijiang Han, Chijun Huang, Bing Tang, Min Hu

School of Environmental Science and Engineering, Guangdong University of Technology, Guangzhou 510006, P.R. China
Tel. +86 20 39322296; Fax: +86 20 39322547; email: fufenglian@gdut.edu.cn

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ABSTRACT

Granular activated carbon supported nanoscale zero-valent iron (GAC–nZVI) was synthesized using liquid-phase reduction and adopted to remove Cr(VI) from wastewater. Batch experiments were used to evaluate the factors impacting Cr(VI) removal and showed that nZVI–GAC mass ratio, GAC–nZVI dosage, initial Cr(VI) concentration and pH value were all important factors. The nZVI–GAC mass ratio was optimized at 1:10 and GAC–nZVI dose was 6.0 g/L. Lower pH and initial Cr(VI) concentration could increase the Cr(VI) removal efficiency. After treatment, the residual total chromium concentration determined by flame atomic absorbance spectrometer equals to the Cr(VI) concentration determined by 1,5-diphenylcarbazide method using UV–vis spectrophotometer. This study demonstrates that the GAC–nZVI has the potential to become an effective agent for the removal of Cr(VI) from wastewater.

Keywords: Hexavalent chromium; Nanoscale zero-valent iron; Granular activated carbon; Supported

*Corresponding author.

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