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Activated carbon impregnated by zero-valent iron nanoparticles (AC/nZVI) optimized for simultaneous adsorption and reduction of aqueous hexavalent chromium: Material characterizations and kinetic studies

Soroosh Mortazavian^a, Hyeunhwan An^a, Dongwon Chun^b, Jaeyun Moon^{a}*

^aDepartment of Mechanical Engineering, University of Nevada, Las Vegas, Las Vegas, NV
89154 USA

^bAdvanced Analysis Center, Korea Institute of Science and Technology (KIST), Seoul, 02792,
Republic of Korea

*Corresponding author

Authors Email addresses:

Soroosh Mortazavian: mortazav@unlv.nevada.edu

Hyeunhwan An: hyeunhwan.an@unlv.edu

Dongwon Chun: chundream98@kist.re.kr

Jaeyun Moon: jaeyun.moon@unlv.edu

Abstract

Nano-scale zero valent iron (nZVI) particles are one of the efficient materials for water treatment. However, their tendency for agglomeration is one of the major reported drawbacks. In this study, nZVI particles were immobilized onto activated carbon (AC/nZVI) using a two-step synthesis procedure and were applied for simultaneous adsorption and reduction of hexavalent chromium (Cr(VI)) from aqueous solutions. Synthesized AC/nZVI was characterized by SEM, EDS, XRD, XPS, and the Tafel corrosion test. The effects of varying annealing temperatures and times in the first synthesis step were investigated by examining crystal structure changes in the

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