Antibiotic amoxicillin removal from aqueous solution using magnetically modified graphene nanoplatelets

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Abstract

The removal of antibiotic amoxicillin (AA) from aqueous solution was investigated using magnetically modified graphene nanoplatelets (M-GNPs). M-GNPs were prepared by mixing GNPs with freshly prepared magnetite nanopartilcles, and characterized using TEM, and XRD. The characterization results revealed the homogenous distribution of the magnetite nanopartilcles over the surface of transparent platelet-like graphene platlets. The M-GNPs proved to possess superior adsorption capacity compared with the pristine GNPs and the magnetite nanopartilces. The effects of different operational parameters which affect the removal process were explored; adsorbent amounts, contact time, initial pH, temperature, and the initial concentration of AA. The results showed the great affinity of the M-GNPs toward the AA and the maximum adsorption capacity was found to be 14.10 mg g(-1). The adsorption mechanism of AA by the M-GNPs involved pi-pi stacking and electrostatic interaction. The adsorption was studied kinetically and thermodynamically, and was found to mainly follow pseudo-second-order kinetic model, and was spontaneous and exothermic in nature. (C) 2016 The Korean Society of Industrial and Engineering Chemistry. Published by Elsevier B.V. All rights reserved.

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