



Humic acid removal efficiency from aqueous solutions using graphene and graphene oxide nanoparticles

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ABSTRACT

Humic acid materials (humic acid and fulvic acid) form the most important section of natural organic materials in water resources. These materials cause a lot of secondary problems, when drinking water is under treatment. Many different methods have been considered for removal of humic acid from aqueous solution. Adsorption process is a common method for removal of humic acid that seems attractive for many experts. The aim of present study is to examine and compare the adsorption of humic acid by graphene and graphene oxide nanoparticles. This experimental research has been done in a bath condition. The effects of various parameters such as pH, contact time, initial concentration of humic acid, adsorbent dosage, and temperature on the removal of humic acid by graphene (G) and graphene oxide (GO) adsorbents have been examined. The maximum amount of humic acid removal by these adsorbents occurred when pH = 3 and initial concentration = 10 mg/L. Also, the adsorption capacity for graphene and graphene oxide in removal of humic acid in optimum experimental conditions were 41.4 and 39.3 mg/g, respectively. The results of adsorption isotherms showed that adsorption of humic acid by G and GO adsorbents follows the Freundlich and Langmuir model, respectively. The results show that the pseudo-second-order kinetic model correlates well with experimental data. The results of examining the thermodynamics of reaction showed that the removal of humic acid is an exothermic reaction.

Keywords: Adsorption; Humic acid; Graphene; Graphene oxide

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