



Highly efficient capture of Cu(II) by magnetic graphene oxide from aqueous solution: influences of pH, ionic strength, temperature, soil humic acid and fulvic acid

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ABSTRACT

In this study, the capture of Cu(II) from aqueous solution by magnetic graphene oxide (MGO) via an adsorption process in the absence and presence of humic acid (HA) or fulvic acid (FA) was investigated by using a batch technique. The effects of contact time, pH, ionic strength, coexisting cations or anions and temperature were studied. The results indicated that the Cu(II) sorption is strongly dependent on pH but independent on ionic strength. A positive effect of HA/FA on Cu(II) adsorption was found at pH < 7.5, whereas a negative effect was observed at pH > 7.5. The adsorption isotherms can be described by the Langmuir model as well as the Freundlich model in the absence and presence of HA/FA. Adsorption isotherms of Cu(II) at higher initial HA/FA concentrations are higher than those at lower FA/HA concentrations. The thermodynamic parameters were calculated from the temperature isotherms, and the results suggested that the sorption was a spontaneous and endothermic process. Results of this work suggest that MGO may be a promising adsorbent for the treatment of heavy metal ions from aqueous solutions.

Keywords: Magnetic graphene oxide; Cu(II); Humic acid; Fulvic acid; Adsorption

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