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APPLICATION OF MAGNETITE NANOPARTICLES AS ADSORBENT FOR Cr, Cd, Ni AND Cu FROM AQUEOUS SOLUTIONS

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Abstract

Magnetite nano-particles (Fe_3O_4) were synthesized in order to be used as adsorbent for some toxic metal ions (Cr, Cd, Ni and Cu) present in aqueous solutions (industrial waste waters). The amount of toxic metals (Cr, Cd, Ni and Cu in quaternary aqueous solutions) before and after contact with the magnetite nano-particles was analyzed by flame atomic absorption spectrometry (FAAS). Different operational parameters such as metal concentration and pH of the quaternary solution, as well as contact time with magnetite nano-particles played an important role in toxic metals adsorption process. The adsorption of Cr, Cd, Ni and Cu onto the magnetite nano-particles is important in acidic conditions (over 87% in the first 10 minutes of contact) and increase with the increase of initial metals concentration of the quaternary solution. Under basic conditions (pH 8.5), the removal efficiency of metals from solution is over 95% in the first 10 minutes and is due to two concurrent processes: precipitation as metal hydroxides (almost 80% from total removal efficiency) and metals adsorption onto magnetite nanoparticles.

Key words: adsorption, magnetite nano-particles, wastewaters

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