Removal of heavy metals from aquatic environment using chopsticks

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The adsorption behavior of chopsticks has been studied with respect to heavy metals (Cr Ni Cu Ag Cd Pb) as a function of pH. Chopsticks were cut into pieces of woodchips. The batch-closed experiments with woodchips were carried out in order to evaluate the removal rate. Heavy metals were efficiently removed by woodchips above pH 4 (over 60% removal rate). The pH dependence of removal rates was caused by the difference of the removal mechanisms. The structural analyses by FT-IR showed that woodchips contained phenolic hydroxyls and carbonyl groups. The various pH tests suggested that heavy metal removal by woodchips were caused by their functional groups. The removal by phenolic hydroxyls depended on pH because of their ion-exchangeability. In contrast, the removal by carbonyl groups was not affected by the pH value. It is possible to conclude that chopsticks had good potentialities as environmentally-thoughtful adsorbents for heavy metals in aqueous solutions.