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Review

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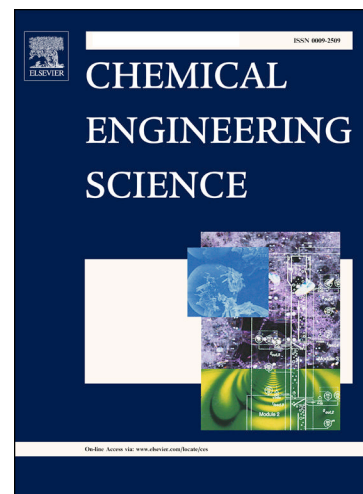
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A review on adsorbents for treatment of water and wastewaters containing copper ions

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Abstract

One of the techniques for the removal of Cu^{2+} from water and wastewaters is adsorption and special attention has been focused on biosorption. Compared to the conventional method, adsorption today is the most suitable method for removing pollutants from wastewater. The adsorption of Cu^{2+} on natural materials such as zeolites and clays is considered, and modified natural materials are also in use because they possess the ion-exchange ability. For industrial applications, the use of biopolymers and hydrogels is proposed because they can reduce the initial concentrations of metal ions to the billions of original concentrations, and are widely available and environmentally safe. The modified biopolymer adsorbents on the basis of polysaccharides (derived from chitin, chitosan, and starch) have been proposed as new materials for the removal of Cu^{2+} ions from wastewater. Nanoparticles based on carbon nanotubes CNTs, as well as new nano-adsorbents based on graphene and its composites, show a very high efficiency of removal of Cu^{2+} from wastewater. The adsorption process on natural adsorbents (biosorption) is a relatively recent process that has found a great application in the removal of heavy metals, phenols, paints and other organic pollutants from wastewater. Adsorption on biosorption has become a potential alternative to existing technologies for the effective removal of low concentrations of Cu^{2+} and other metals from aqueous solutions and wastewaters because of the simplicity, cost-effectiveness and high capacity of removing both organic and inorganic water pollutants. The results of bibliographic searches show that many agricultural by-products, as well as waste materials from the food and wood industry, which have low or almost no economic value, can be used as adsorbents for the adsorption of Cu^{2+} ions from the solution.

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