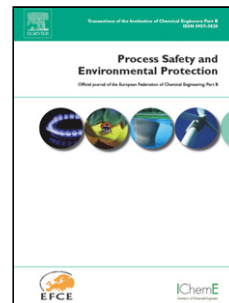


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Nanocomposite of ZnO with Montmorillonite for Removal of Lead and Copper Ions from aqueous solutions

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Abstract

The clay minerals montmorillonite (MMT) was combined with ZnO to form efficient nanocomposite which was used as an adsorbent. Zinc oxide nanoparticle (ZnO-NP) was successfully incorporated into the layers of montmorillonite by green simple heat method using zinc nitrate and sodium alginate as zinc oxide precursor and stabilizer respectively. The XRD and FESEM measurements revealed the presence of ZnO nanoparticles with hexagonal wurtzite structure in the ZnO/MMT nanocomposites. The role of the ZnO in enhancing the adsorption efficiency of the ZnO/MMT nanocomposite for the removal of copper and lead ions from aqueous solutions was investigated. The effects of different parameters such as contact time, dosage, initial concentration, and pH were investigated. Kinetics of adsorption were studied using pseudo-first-order and pseudo-second order. The efficiency of the nanocomposites was studied by Langmuir and Freundlich isotherms. The material showed high efficiency in a wide pH range, for the adsorption of Pb and Cu ions. Kinetic studies showed that the adsorption

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