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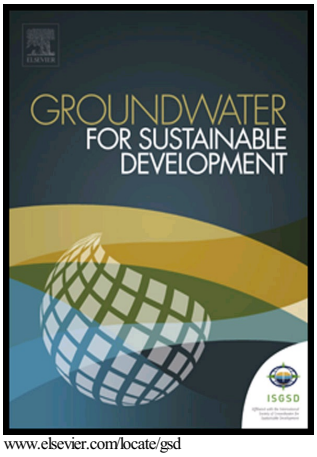

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Synthesis of sustainable mesoporous treated fish waste as adsorbent for Copper Removal

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Abstract

Mesoporous Treated Fish waste obtained at a temperature of 600 °C was investigated as a sustainable and cost-effective material for copper (II) removal in aqueous solution. The structural and micro structural study and the chemical composition of our elaborated material were realized by BET, SEM-EDS, FTIR, TGA and DTA. Several adsorbent effects have been optimized to have; adsorbent dose, contact time, pH of the solution and initial concentration. The results revealed that 96% of copper (II) was removed in the best adsorption conditions: pH = 4, an adsorbent dose of 4g/L, 360 min reaction time and 5 mg L^{-1} of Cu (II) initial concentration. Experimental results showed that the pseudo-second-order model gave the best description of the adsorption kinetics of copper (II), as well as the Langmuir model was the best applicable model to describe the isotherm. Waste fish show promising results in removing copper (II) in aqueous solution. These results present new sustainable, cost-effective material as a promising adsorbent for copper (II) removal from wastewater. The regeneration of SMTFW showed a low reduction, which confirmed that our adsorbent can be considered as a sustainable material for copper adsorption. Finally, the adsorption mechanism was proposed on the basis of FTIR analyses before and after adsorption.