

Tamanrasset's Clay Characterization and Use as Low Cost, Ecofriendly and Sustainable Material for Water Treatment: Progress and Challenge in Copper Cu (II)

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Abstract: In this study, the adsorption of copper Cu (II) from aqueous solution, on Tamanrasset's clay which is low cost adsorbent, was studied using batch experiments. The adsorption study includes both equilibrium adsorption isotherms and kinetics. The characterization of the adsorbent necessitated several methods such as X-Ray Diffraction, Scanning Electron Microscopy coupled with Energy Dispersive X-ray, BET for specific surface area determination, Fourier transform infrared spectroscopy and thermogravimetric analysis. Indeed, various parameters were investigated such as contact time, initial metal ion concentration, mass of solid, pH of the solution and temperature. The adsorption process as batch study was investigated under the previous experimental parameters. The results revealed that the adsorption capacity of Cu^{2+} is maximized at natural pH of metal 5.5. Removal of copper by the clay of Tamanrasset (kaolinite) achieved equilibrium within 50 minutes; the results obtained were found to be fitted by the pseudo-second order kinetics model. The equilibrium process was well described by the Langmuir model and the maximum adsorption capacity was found to be 26.59 mg/g.

Keywords : adsorption, Clay, copper, kinetic, Isotherms