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

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Abstract: In this study, the adsorption of copper Cu (II) from aqueous solution, on Tamanrasset'sclay which is low cost adsorbent, was studied using batch experiments. The adsorption study includesboth equilibrium adsorption isotherms and kinetics. The characterization of the adsorbent necessitatedseveral methods such as X-Ray Diffraction, Scanning Electron Microscopy coupled with EnergyDispersive X-ray, BET for specific surface area determination, Fourier transform infraredspectroscopy and thermogravimetric analysis. Indeed, various parameters were investigated such ascontact time, initial metal ion concentration, mass of solid, pH of the solution and temperature. Theadsorption process as batch study was investigated under the previews experimental parameters. Theresults revealed that the adsorption capacity of Cu^{2+} is maximized at naturel pH of metal 5.5. Removalof copper by the clay of Tamanrasset (kaolinite) achieved equilibrium within 50 minutes; the resultsobtained were found to be fitted by the pseudo-second order kinetics model. The equilibrium processwas well described by the Langmuir model and the maximum adsorption capacity was found to be26.59 mg/g.

Keywords : adsorption, Clay, copper, kinetic, Isotherms