ADSORPTION OF Cu(II) FROM AQUEOUS MEDIUM ON FIRED BRICK PARTICLES

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Removal of heavy metals such as copper from aqueous solutions is necessary because of their frequent appearance in waste water. Use of environmentally friendly and readily available substances for this purpose is therefore a current need. The work reported here deals with investigation on the use of locally available fired brick particles, based on its excellent metal sorptive properties, for the removal of Cu(II) from aqueous solution, as an alternative to existing chemical treatments.

Treatment of aqueous Cu(II) solutions with fired brick particles having diameters of 1-2 mm at ambient temperature and pressure indicates high rates of adsorption according to atomic absorption measurements. Although equilibrium is reached quickly and strong irreversible adsorption of Cu(II) is favoured at low concentrations of Cu(II) (e.g., 5.0 ppm), it takes longer time to reach adsorption/desorption equilibrium at higher concentrations (e.g., 20 ppm). The percent removal increases up to more than 90% in neutral or basic solutions and then levels off under the experimental conditions and parameters used in this investigation. However, the saturation limit of the percent removal depends on the dose of the adsorbent as expected. Extent of adsorption at different initial concentrations of Cu(II) solutions fit both the Langmuir and Fruendlich isotherm models suggesting monolayer coverage followed by possible ion exchange.

Continuous increase in the amount of the Cu(II) adsorbed per unit mass of adsorbent support the suggestion of ion exchange of Cu(II) ions with those having lower affinity within the brick matrix such as Mg ions. Further, desorption studies indicate the strong irreversible adsorption of Cu(II) ions on brick, and consequently, this investigation would open up a new avenue of using fired brick particles, an industrial byproduct, which would otherwise be wasted with no value addition.