Arsenic poisoning is a major problem in today’s life. To reduce its concentration in drinking water, different metal based compounds were explored as arsenic adsorbents. In the present study, copper (II) oxide nanoparticles were prepared by thermal refluxing technique and used as an adsorbent for arsenic removal from water. Characterization of the adsorbent using TEM, BET, XRD and FTIR implied that the prepared adsorbent was in nano size and had excellent adsorption behavior with surface area of 52.11 m²/g. Systematic adsorption experiments were carried out with different process parameters such as contact time, adsorbent mass, pH, temperature and stirring speed and found that copper (II) oxide had very good efficiency towards arsenic adsorption. Thermodynamic parameters and adsorption kinetics were studied in detailed to know the nature and mechanism of adsorption. Results showed that the adsorption process followed pseudo second order kinetic and endothermic behavior. Adsorption equilibrium was studied with Langmuir and Freundlich isotherm models. The adsorption process followed Langmuir isotherm with an adsorption capacity of 1086.2 μg/g. A regeneration study was proposed in order to reuse the adsorbent for better economy of the process. Finally, a process design calculation is reported to know the amount of adsorbent required for efficient removal of arsenic from aqueous medium.

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Keywords: Arsenic; Copper (II) oxide; Adsorption; Kinetics; Isotherm