

STUDY ON THE REMOVAL OF CADMIUM ION FROM WATER BY ADSORPTION ON NANO-NICKEL OXIDE

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The major hazardous metals in terms of their environmental load and health effects are: lead, mercury, chromium, cadmium, copper and aluminum. Adsorption is a conventional but efficient technique to remove toxic metal ions and bacterial pathogens from water. In this study, adsorption process performance was assessed using metal oxide (NiO) nano particles for water treatment containing heavy metals in a laboratory scale. Nickel oxide nanoparticles were prepared and fully characterized considering their adsorption properties (pore size distribution) as well as their chemical structure and morphology. The adsorption of heavy metal ions Cd²⁺ was studied in batch experiments. Various physio-chemical parameters such as pH, initial metal ion concentration, and adsorbent dosage level and equilibrium contact time were studied. The study found that the percentage removal increases with increasing the time of shaking until an approximately constant percentage of removal has been reached after 30 minutes. The percentage removal increases with increasing the adsorbent mass until it reaches a maximum value of 77.1% at 0.3 g of nano-nickel oxide adsorbent. The effect of pH value on adsorption of Cd²⁺ it was found that the percentage removal increases with increasing pH until it reaches its maximum value 77.1% at pH=9. It was found that the percentage removal of cadmium ion decreased from 86.6% to 51.8% by increasing the initial concentration from 15 to 100 ppm. Statistical analysis shows that the equilibrium adsorption data was best fitted by the Langmuir adsorption isotherm model and the pseudo second order kinetic model provided good correlation for the adsorption of Cd²⁺ onto nickel oxide

Biography

Ehssan Nassef completed her PhD from Faculty of Engineering, Alexandria University, Egypt (2000) and Postdoctoral studies from Faculty of Engineering, the Pharos University, Alexandria, Egypt in 2010. She has published more than 25 papers in reputed journals and has been serving as an Editorial Board Member of reputed and she is also certified associated trainer from IBCT.

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