

Removal of heavy metal ions (Cd^{2+} , Pb^{2+} , Ni^{2+} , Zn^{2+} and Cr^{2+}) and Rhodamine (B) dye using nanostructured Graphite Oxide

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Heavy metals are known to be toxic for living organisms even if they are present at low levels. The presence of heavy metals, organic dyes and microbial pollutants in water continues to be major concerns and the removal of such contaminants is considered to be a major problem in environmental remediation. In the present study, nanostructured graphite oxide, silica graphite oxide composite and silica nanoparticles were used for the removal of heavy metal ions, microbial pollutants and Rhodamine (B) dye in aqueous solutions by a batch adsorption method. The experimental data were calculated using Langmuir and Freundlich adsorption isotherms. The results revealed that the adsorption of heavy metals by graphite oxide nanoparticle was observed in the following decreasing order: nickel, zinc, lead, cadmium and chromium. The removal percentage decreased as the concentration of heavy metal pollution increased. Therefore, the increase of solution concentration leads to decrease in the adsorption capacity of heavy metal ions by adsorbent. Langmuir's adsorption isotherm results revealed that the graphite oxide nanoparticle is an effective adsorbent for the removal of Nickel ions from aqueous solutions, while Freundlich values of $1/n < 1$ obtained for Cadmium, Chromium, Lead, Nickel and Zinc ions suggest monolayer type of pollutants adsorption by graphite oxide nanoparticle. Moreover, the removal percentage of Rhodamine (B) dye in aqueous solution increased with the increase in initial Rhodamine (B) dye concentration. However, silica graphite oxide nanocomposite (2:3) was more efficient in the removal of nickel ions (91.8% at 30 ppm and 84.7% at 200 ppm) than graphite oxide and silica nanoparticles

Biography

Ahmad Kabbani holds a Ph.D. in physical chemistry from the University of California Davis (1979), He is a NIH Scholar at UCD Davis in 1987, He worked as a Research Scientist at Rice U in 2007. He taught crystallography /diffraction graduate course in 2012-2013 at Rice U. At present he is a full professor of chemistry at the Lebanese American U- Beirut Lebanon.

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