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Zinc and cadmium adsorption on low-grade phosphate

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Abstract: An attempt was made to utilize low-grade phosphate (LGP) as an adsorbent for Zn2+ and Cd2+ over a range of initial metal ions concentrations (10?50 ppm), agitation time (5?210 min), adsorbent concentration (1?7 g/l) and pH (2?6). Adsorption of both Zn2+ and Cd2+ increased with increased LGP concentration and reached maximum uptake at 5 g/l and pH between 4 and 6 for both metal ions. The amount adsorbed increases with time and initial metal concentrations for both metal ions. The equilibrium time was achieved for both metal ions after 30 min. The process of uptake obeys both the Langmuir and Freundlich isotherms. The affinity of LGP for H+ is considerably higher than for Zn2+ and Cd2+. The equilibrium uptake of zinc ions decreases with the increase in the initial cadmium ions concentration and that of cadmium ions decreases as the initial zinc ions concentration increases. Desorption of LGP with 0.1 N H2SO4 was done for three cycles successfully.