

Nidcha Aroonrote 2014: Effects of Cross-linked Chitosan Beads with Epichlorohydrin and *N*-carboxymethyl on Adsorption of Lead(II) and Zinc(II) Ions from Aqueous Solutions and Electroplating Wastewater. Master of Science (Environmental Science and Technology), Major Field: Environmental Science and Technology, Department of Science. Thesis Advisor: Assistant Professor Thitiya Pung, Ph.D. 103 pages.

The preparation, physical and chemical properties of chitosan beads (CH) epichlorohydrin cross-linked chitosan beads (ECH) and modified cross-linked with *N*-carboxymethyl chitosan beads (ECH-NC) were studied. All type of chitosan beads were sphere and sizes were 0.20 cm. The CH was soluble in acidic solution while ECH and ECH-NC were insoluble. The CH, ECH and ECH-NC were tested for optimum conditions and adsorption capacity for Pb(II) and Zn(II) ions from aqueous solutions. Results showed that amounts of beads were 0.50 g, metal ions concentrations of 200 mg/L at pH 5 for 4 hours. The maximum adsorption capacities for Pb(II) and Zn(II) ions on CH, ECH and ECH-NC were 1553.68 ± 5.24 , 649.70 ± 7.90 and 1452.00 ± 29.21 $\mu\text{g/g}$ and 1213.44 ± 33.13 , 180.25 ± 36.47 and 1431.40 ± 17.38 $\mu\text{g/g}$, respectively. The kinetics adsorptions of CH, ECH and ECH-NC for metal ions were related with the pseudo second-order kinetic equation. The adsorption equilibrium isotherms were followed the Langmuir isotherm. Adsorption capacities for Pb(II) and Zn(II) ions on CH, ECH and ECH-NC from electroplating wastewater under batch conditions showed that ECH and ECH-NC can adsorbed all for Pb(II) ions of 190 $\mu\text{g/g}$. The adsorption capacity for Zn(II) ions on ECH and ECH-NC were 996.58 ± 41.30 and 1364.58 ± 15.62 $\mu\text{g/g}$, respectively.

Student's signature

Thesis Advisor's signature