

Warangkana Rerkpalin 2003: Complex Formation of 2-(2'-Thiazolylazo)-p-cresol and Its application as Chelating Reagent for Cadmium(II) and Copper(II). Master of Science (Chemistry), Major Field: Inorganic Chemistry, Department of Chemistry. Thesis Advisor: Assistant Professor Apisit Songsasen, Ph.D. 79 pages.
ISBN 974-358-166-9

The properties and applications of 2-(2'-thiazolylazo)-p-cresol (TAC) have been studied. TAC was synthesized by diazotisation of 2-aminothiazole and coupling with p-cresol. TAC gives brown needles-shaped crystals with melting point of 131-132 °C. TAC forms complex with copper(II) at pH 3.0, 5.0, 7.0 and 10.0. The color of copper(II)-TAC complex is green at pH 3.0, 5.0 and 7.0 and red-violet at pH 10.0. The maximum absorption of copper(II)-TAC complexes are 608, 605, 605 and 558 nm at pH 3.0, 5.0, 7.0 and 10.0, respectively. Color of cadmium(II)-TAC complex is yellow at pH 7.0, violet at pH 7.5 and 8.0 ,and red-violet at pH 9.0. The maximum absorption of cadmium(II)-TAC complexes are 550, 555, 555 and 555 nm at pH 7.0, 7.5, 8.0 and 9.0, respectively. The ratio of copper(II) : TAC and cadmium(II) : TAC in their complexes are 1 : 1 in acidic and basic conditions.

The chelating resin (P-TAC) was prepared by immobilization of TAC on chloromethylated polystyrene divinylbenzene in a mixture of 1:1 triethylamine and dimethylformamide. The ability of P-TAC for adsorption of copper(II) and cadmium(II) has been studied by batch equilibrium experiment. The pH, initial concentration of metal ions and shaking time for sorption of copper(II) and cadmium(II) were optimized to give the maximum adsorption capacity of P-TAC. The maximum capacity of P-TAC for the sorption of copper(II) and cadmium(II) were obtained at pH 5.5 and 7.5, respectively. The sorption of copper(II) and cadmium(II) on P-TAC increase with increasing shaking time. The maximum capacity for copper(II) and cadmium(II) were $3.713 \times 10^{-2} \text{ mmol g}^{-1}$ and $0.3052 \text{ mmol g}^{-1}$, respectively. Copper(II) and cadmium(II) on P-TAC were successively eluted by 2.0 molar hydrochloric acid and 1.0 molar nitric acid respectively. The efficiency of P-TAC for sorption of copper(II) and cadmium(II) decrease when the P-TAC is reused three times. P-TAC was used to separate cadmium(II) and copper(II) from synthetic waste solution.