

Ratanon Chotima 2008: Synthesis, Characterization and Application of Complex between 3-(2'-Thiazolylazo)-2,6-Diaminopyridine and Ruthenium(III). Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Apisit Songsasen, Ph.D. 141 pages.

3-(2'-thiazolylazo)-2,6-diaminopyridine (TADAP) was synthesized by diazotization of 2-aminothiazole and coupling with 2,6-diaminopyridine. FT-IR, ^1H -NMR, mass spectroscopy and elemental analysis were used to identify the structure of TADAP. The complex between TADAP and ruthenium(III) was prepared by refluxing TADAP and $\text{RuCl}_3 \cdot x\text{H}_2\text{O}$ in tetrahydrofuran for 8 hours which gave red-brown complex at pH 7.0. The stoichiometric ratio of ruthenium(III) and TADAP was 1:2 with the stability constant 3.33×10^8 . FT-IR and ^1H -NMR were used to determine the structure of the complex which was confirmed by quantum chemical calculation at B3LYP level of theory using 6-31G* basis set for all atoms and SDD basis set with Stuttgart/Dresden electron core potential for ruthenium atom. It was found that $[\text{Ru}(\text{TADAP})_2\text{Cl}_2]^+$ was the most stable complex with the stabilization energy -1198.15 kcal/mol.

TADAP was immobilized on silica gel and gave the chelating resin (TADAP-SG) which had adsorption ability of ruthenium(III). The appropriate condition of the adsorption of ruthenium(III) was determined by batch equilibrium experiment. The capacity of TADAP-SG was 2.9022 mmol/g. 0.1 M thiourea was used as the eluent for the desorption of ruthenium(III) from TADAP-SG and TADAP-SG had an efficiency to reuse up to 3 times. TADAP-SG has great affinity for ruthenium(III) more than palladium(II), gold(III), iron(III) and copper(II). In addition, there might be an interaction between the complex and calf thymus DNA in Tris-HCl buffer pH 7.4 due to the precipitate and absorbance changing.

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