

Bussaba Boonseng 2009: Synthesis, Characterization and Application of Rhodium(III) and Platinum(IV) Complexes with 2-(2'-thiazolylazo)-5-aminoanisole and 4-(2'-thiazolylazo)-3-aminoanisole. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Apisit Songsasen, Ph.D. 235 pages.

2-(2'-thiazolylazo)-5-aminoanisole (*p*-amino TAA) and 4-(2'-thiazolylazo)-3-aminoanisole (*o*-amino TAA) was synthesized by diazotization of 2-aminothiazole and coupling with *m*-anisidine. FT-IR, <sup>1</sup>H-NMR, mass spectroscopy and elemental analysis were used to identify the structure of *p*-amino TAA and *o*-amino TAA. The acid dissociation constants ( $pK_a$ ) of the two compounds determined by half-height method and limiting absorbance methods were 3.0 and 3.3, respectively. The stoichiometric studies showed that the ratio of rhodium(III) with both ligands and platinum(IV) with *o*-amino TAA were 1:2 with the stability constants in the range of  $10^9$  to  $10^{10}$  while the ratio between platinum(IV) and *p*-amino TAA were 1:1 with the stability constant of  $10^5$ . The complexes of rhodium(III) were prepared by refluxing. The structures of complexes were characterized by FT-IR and <sup>1</sup>H-NMR spectroscopy. The structures of complexes between rhodium(III) and *p*-amino TAA were also determined by quantum chemical calculations at B3LYP level of theory using 6-31G\* basis set for all atoms and SDD basis set for rhodium atom. The results showed that *trans*-[Rh(*p*-TAA-*n*)<sub>2</sub>(Cl)<sub>2</sub>]<sup>+</sup> was the most stable complex with the stabilization energy of -1350.72 kcal/mol.

Binding of calf thymus DNA with rhodium(III) complexes was studied by UV-Vis spectroscopy. There was evidence from the experiment which showed the interaction between these complexes and CT DNA. The results from quantum chemical calculations indicated that this interaction did not occur via the dissociation reaction of chloride ion. So this interaction could be spontaneous reaction via other mechanisms or mode of binding.

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Thesis Advisor's signature

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