

ABSTRACT

Title : 2-(5'-Chloro-2'-pyridylazo)-5-Aminoanisoie : New Reagent
for Spectrophotometric Determination of Rhodium(III)
and Palladium(II).

By : Wantana Sasomsap

Degree : Master of Science (Chemistry)

Major Field : Analytical Chemistry

Chairman, Thesis Advisor : P. Sutthivaiyakit
(Pakawadee Sutthivaiyakit)

17 / August / 1989

A new sensitive spectrophotometric reagent, 2-(5'-chloro-2'-pyridylazo)-5-aminoanisoie (5-Cl-PAAA), has been prepared by coupling sodium 5-chloro-2-pyridyldiazotate with m-anisidine in super-dry ethanol under carbon dioxide atmosphere. The spectral characteristics and color reactions of 5-Cl-PAAA with metal ions are described.

5-Cl-PAAA forms a purple-red 2:1 complex with rhodium(III) at 80°C in an acetate buffer (pH 5). The rhodium(III) complex exhibits two absorption maxima at 545 nm (molar absorptivity $5.76 \times 10^4 \text{ l mol}^{-1} \text{ cm}^{-1}$) and 575 nm (molar absorptivity $5.06 \times 10^4 \text{ l mol}^{-1} \text{ cm}^{-1}$), respectively. Spectrophotometric determination of rhodium(III) has been developed at 545 nm. Beer's law is obeyed over the concentration range of 0.005-1.23 ppm. of rhodium(III) at 545 nm. The coefficient

of variation on the measurement 0.514 μg of rhodium(III) is 0.98% and the detection limit is 0.0017 μg per ml of rhodium(III). The effect of diverse ions is also reported. The method has been applied to the determination of rhodium(III) in synthetic electroplating solutions containing various ratio of Rh(III) : SO_4^{-2} .

A new spectrophotometric determination of palladium(II) has also been developed. 5-Cl-PAAA forms a red-purple 1:1 complex at room temperature in a phosphate buffer (pH 7). The palladium(II) complex formed shows maximum absorption at 566 nm. Beer's law is obeyed over the concentration range of 0.011-2.13 ppm of palladium(II) at 566 nm. The coefficient of variation on the measurement 1.064 μg of palladium(II) is 0.71% and the detection limit is 0.0069 μg per ml of palladium(II). The effect of diverse ions is also investigated. The method has been applied to the determination of palladium (II) in synthetic mixtures containing various ratios of Pd(II) : Fe(III).