

The effect of ligand structure on the luminescence properties of Palladium (II), Platinum (II), and Gold (III) complexes through temperature and pressure dependence

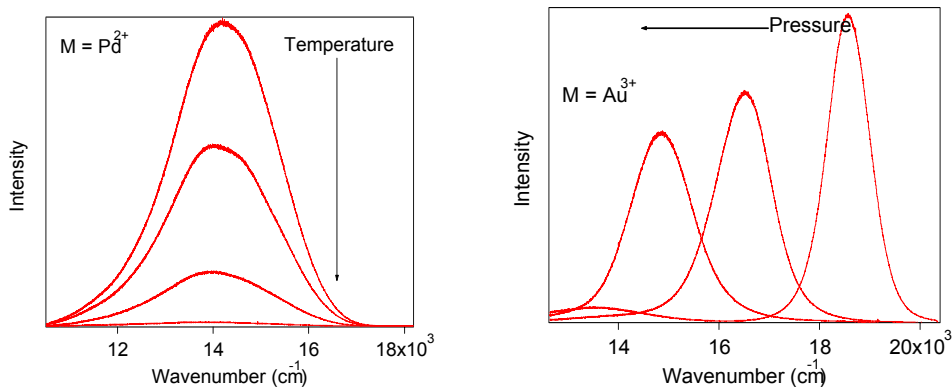
Kari A. Frantzen

University of Victoria, Victoria BC
RISE placement with C. Reber, Université de Montréal, Montréal QC

A series of square-planar d^8 transition metal complexes have been prepared in order to study the effect of ligand structure on luminescence properties.

The previously studied $[\text{Pd}(\text{SCN})_4]^{2-}$ complex shows significant luminescence intensity increases when subjected to low temperature and high pressure¹. By replacing the monodentate SCN^- ligand with the bidentate pyrrole-*N*-carbodithioate (pdtc) ligand, we examine the differences in the luminescence spectra of $\text{Pd}(\text{pdtc})_2$, $\text{Au}(\text{pdtc})_2$, and $\text{Pt}(\text{pdtc})_2$, through temperature and pressure dependence, and luminescence lifetimes.

Luminescence band maxima for the Pd^{2+} and Pt^{2+} complexes were $\sim 14,200 \text{ cm}^{-1}$ and $16,000 \text{ cm}^{-1}$ respectively. Both complexes displayed significant luminescence intensity increases with decreasing temperature and increasing pressure. The Au^{3+} complex band maxima was centred at $\sim 18,300 \text{ cm}^{-1}$, and displayed a large, unanticipated pressure-induced peak shift of $-93 \text{ cm}^{-1}/\text{kbar}$.



¹ J.K. Grey, I.S. Butler, and C. Reber, *J. Am. Chem. Soc.*, **124**, 9384, (2002).