

MASS-INDEPENDENT DUNHAM ANALYSIS OF NEW ELECTRONIC TRANSITIONS OF PtX (X=F, Cl) OBSERVED USING INTRACAVITY LASER SPECTROSCOPY

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Several vibrational bands of new electronic transitions of PtF and PtCl have been recorded in absorption using Intracavity Laser Spectroscopy (ILS). The PtX molecules were produced in current-regulated RF plasma discharges, operating with 0.30-0.80 A applied to a Pt-lined Cu hollow cathode in approximately 1 Torr of an Ar/He sputter gas mixture. A trace amount of SF₆ was used as the fluoride source for PtF, and a trace amount of CCl₄ was used as the chloride source for PtCl. The hollow cathode was located within the resonator cavity of either a DCM dye laser (14,500-16,500 cm⁻¹) or Ti:Sapphire laser (12,890-12,990 cm⁻¹; 13,255-13,365 cm⁻¹), and effective pathlengths of 0.4-2.0 km were utilized with the ILS method. Six vibrational bands were identified for PtF and eight vibrational bands were identified for PtCl. These band systems were assigned to the [15.8+x] $\Omega=5/2-B^2\Delta_{5/2}$ transition of PtF and the [13.8] $\Omega=3/2-X^2\Pi_{3/2}$ transition of PtCl. Both electronic transitions were fit to a mass-independent Dunham type Hamiltonian using PGOPHER. Isotope dependent deviations from the Dunham model were observed due to both Born-Oppenheimer breakdown and field-shift effects resulting from differences in nuclear charge density between Pt-isotopes. The results of the analyses will be presented.