

ZEKE SPECTROSCOPY OF ALUMINUM AND GALLIUM COMPLEXES OF PIPERIDINE

PARAGRANJITA BHOWMIK, SHENGGANG LI, BRADFORD R. SOHNLEIN, JASON F. FULLER, XU WANG, and DONG-SHENG YANG, *Department of Chemistry, University of Kentucky, Lexington, KY 40506.*

The Al and Ga complexes were produced by reactions of laser-vaporized metal atoms with piperidine ($C_5H_{11}N$) and characterized by pulsed field ionization-zero electron kinetic energy (PFI-ZEKE) spectroscopy. For $Al-C_5H_{11}N$, the adiabatic ionization potential was measured to be 37060 cm^{-1} , and vibrational frequencies were determined for the Al^+-N stretching (238 cm^{-1}), $Al^+/Al-N-C$ bending ($84/105\text{ cm}^{-1}$) and piperidine-based vibrations (300 and 464 cm^{-1}). By comparing the ZEKE measurements with *ab initio* calculations, the neutral and ionic aluminum complexes were determined to be in C_s symmetry with Al binding to the nitrogen of the chair-like piperidine ring. For the gallium complex, the ZEKE spectrum shows an ionization potential of 37529 cm^{-1} , a Ga^+-N stretching frequency of 176 cm^{-1} and a Ga^+-N-C bending frequency of 70 cm^{-1} .