

VIBRONIC SPECTRA OF GROUP 13 METAL-PIPERIDINE COMPLEXES

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Group 13 (Al, Ga, and In)-piperidine complexes are produced in a pulsed metal-cluster beam source, observed by time-of-flight mass spectrometry, and characterized with pulsed-field-ionization zero electron kinetic energy spectroscopy. The spectrum of each complex exhibits several vibronic progressions associated with metal-ligand stretching, metal-ligand bending, or ligand-based vibrations. The Franck-Condon profile of the Al-piperidine spectrum is considerably shorter than those of Ga/In-piperidine, suggesting a larger charge effect on the structures of the heavier metal complexes. Electronic states, active vibrational modes, metal binding sites, and the conformation of the metal coordinated piperidine are identified by comparing the spectra of the three complexes and with theoretical calculations.