

INFRARED SPECTROSCOPY OF METAL LIGAND AND METAL OXIDE LIGAND COMPLEXES

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Metal ligand and metal oxide ligand complexes are generated in a laser vaporization/supersonic expansion cluster source and are mass selected and studied using infrared spectroscopy in the 600-4000 cm^{-1} region using a tunable infrared OPO. Several different systems are investigated and some show evidence for intracluster reactions to form metal oxide species or coupling of coordinating ligands. In particular the $\text{V}(\text{CO}_2)_n^+$ system shows evidence for the onset of an intracluster reaction at $n=7$ as evidenced by the sudden appearance of a band at 1800 cm^{-1} . DFT calculations are performed in support of this work and several possible interpretations of the experimental data will be presented.