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Elucidating Periodic Trends in Metal-Ligand Complexes

Ethan M Cunningham

Department of Chemistry
University of Oxford – United Kingdom

Metal ions and their electrostatic interactions with ligands are widespread in chemistry serving as both prototypes for bonding in inorganic and organometallic chemistry and playing a pivotal role in catalytic processes. There is much interest in investigating gas-phase metal ion complexes in the hope of better understanding fundamental metal-ligand interactions and metal ion solvation, both of which contribute to fundamental processes in chemistry, biology, geochemistry and astrophysics. The ligand of interest in this work, nitrous oxide, is a potent greenhouse gas, implicated in depletion of stratospheric ozone.

Gas-phase studies on isolated M+(N2O)n complexes have been investigated using infrared laser photodissociation spectroscopy. Coupled with density functional calculations these complexes are analysed in terms of N2O binding via the N atom or the O atom, resulting in characteristic shifts in the v3 stretch of N2O. It is comparatively unusual for one ligand to bind in multiple arrangements, and the ability to selectively excite one binding motif over another, as demonstrated here, offers the tantalizing prospect of driving mode-selective reactivity in different structural isomers.

Hörsaal G **17:15 Uhr** **28.11.2018**