A SPECTROSCOPIC INVESTIGATION OF THE EFFECTS OF SPIN STRAIN ON LN_3O^- CLUSTERS

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In the world of single molecule magnets (SMMs), lanthanide-based single molecule magnets have proven to be potential source of strong anisotropic magnetic moments and recent research has sought to harness these properties in the creation of SMMs with long spin relaxation lifetimes and high blocking temperatures. The properties of these lanthanide SMMs are dictated by both the lanthanide identity as well as the structure of the magnetic core, and SMMs with odd-numbers of metal centers have been seen to exhibit exciting magnetic properties such as spin frustration and toroidal spin moments. Expanding on previous studies of bimetallic lanthanide oxide clusters we employ anion photoelectron spectroscopy and computational modelling of gas-phase Ln_3O^- (Ln = Ce, Sm, Gd) clusters to better understand the effects of spin strain on the electronic and magnetic properties of ligand-free SMM cores. Spectra exhibit the typical binding energies of lanthanide oxide clusters (between 0.7eV and 1.2 eV) and photoelectron angular distribution anomalies we attribute to interactions between departing photoelectrons and remnant neutral clusters are observed.