

## A SPECTROSCOPIC EXPLORATION OF $\text{MoMnO}_y^-$ CLUSTERS AS HYDROGEN EVOLUTION CATALYSTS

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Due to its large band gap and uniquely layered crystalline structure,  $\text{MoO}_3$  is an attractive material in the field of organic photovoltaics.  $\text{MoO}_3$  has also been reported to exhibit photo- and electrochromic activity, and shows great promise as a catalyst, sensing material, and electrode in lithium-ion batteries. Previous studies have explored the reactivity of the  $\text{Mo}_x\text{O}_y + \text{H}_2\text{O} \rightarrow \text{Mo}_x\text{O}_{y+1} + \text{H}_2$  reaction. This most recent study introduced Mn to the  $\text{Mo}_x\text{O}_y$  structure in order to create a less oxophilic metal center. Photoelectron spectroscopy aided by a newly implemented planar ion funnel were utilized to probe the unique electronic properties of anionic  $\text{MoMnO}_y^-$  clusters reacted with  $\text{H}_2\text{O}$ , to illuminate how this substituted element impacted the two-centered mechanism of hydrogen evolution. Of particular interest were the structures of  $\text{MoMnO}_4^-$  when produced by direct laser ablation and as a product of oxidation of  $\text{MnMoO}_3^-$  with  $\text{H}_2\text{O}$ .