On the Reactivity of Al$_{13}$I$_n^-$ and Al$_{14}$I$_m^-$ Clusters with Methanol$^1$ M.B. ABREU, A.C. REBER, S.N. KHANNA, Department of Physics, Virginia Commonwealth University — Al$_{13}$ and Al$_{14}$ cluster anions act as halogen or alkaline earth superatoms respectively when bound by I atoms. Al$_{13}$I$_2^-$ and Al$_{14}$I$_3^-$ have enhanced resistance to oxidation by oxygen because of the clusters’ closed electronic shells, however the reactivity of aluminum clusters with methanol depends on the presence of complementary active sites. We have examined the reactivity of Al$_{13}$I$_n^-$ and Al$_{14}$I$_m^-$ with methanol to identify if the presence of electronegative Iodine may induce active sites on the cluster. The presence of a single Iodine atom on Al$_{13}^-$ is insufficient to activate the cluster, however two adjacent ligands induce an active site and makes the cluster highly reactive. The Al$_{14}$I$_m^-$ clusters are found to be reactive with methanol highlighting the importance of geometric shell closures in ligand protected clusters.

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