Small Molecule Activation by ortho-Phenylene-Bridged Frustrated Lewis Pairs
J.M. Overbeek

Abstract

The ability of sterically frustrated Lewis pairs (FLPs) to activate small molecules has gained much attention over the past two decades. o-Phenylene-bridged FLPs are especially well-suited for small molecule activation, since the short distance between the acid and base enhances their ability to polarize chemical bonds. In this thesis an o-phenylene-bridged FLP was exposed to several small molecules to evaluate its reactivity. ((o-diphenylboryl)phenyl)-diphenylphosphine was found to reversibly activate benzonitrile and acetone. These reactions exhibit a dynamic equilibrium that can be tuned by variation of temperature. Complete complexation was achieved at temperatures lower than -60°C and -10 °C, respectively. These results are promising, since they demonstrate a dynamic bonding situation of substrate and FLP, a useful property with respect to closing a possible catalytic cycle.