

Seminar

Sb and Bi Lewis Acids: Access to Reactive Cations and Implications in Catalysis Cell

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Salts of heavier pnictogens (Pn), Antimony, and Bismuth in +3 oxidation state commonly find application as Lewis acids in organic synthesis. Common examples of these salts include chlorides, carboxylates, and trifluoromethanesulfonate. A qualitative model for the origin of Lewis acidity in Sb(III) and Bi(III) compounds was proposed by Norman in 1994. According to this model, a polarized Pn–X bond has a corresponding low-lying antibonding σ^* -orbital that can accept a pair of electrons. The Pn–X bonds constitute the primary bonds, while the interaction between antibonding orbitals and Lewis bases constitutes the secondary bonding. The energy levels of the antibonding orbitals and the Lewis acidity of PnX_3 depend on the extent of polarization in primary bonds. Ligand choice determines the tuning of the σ^* orbital energy providing a tool to control the Lewis acidity in antimony and bismuth Lewis acids. Based on our recent findings, this presentation will provide insights into the ligand effects as a design parameter to access new antimony and bismuth Lewis acids. Catalytic hydrosilylation and carbonyl olefin metathesis are demonstrated as proof of our concept.

Wednesday, Sep 13th 2023

11:30 AM (Tea / Coffee 11.15 AM)

Auditorium, TIFR-H