

Borane Lewis Acids: From Molecules to Materials

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The ability of tricoordinate borane moieties to participate in pi-delocalization can have a dramatic effect on the optical properties of conjugated materials by selectively lowering the LUMO orbital levels. The electron-deficient character of boron also enables Lewis acid-base interactions, resulting in strong perturbations of the electronic structure. These materials have been studied for applications in areas ranging from biological imaging, lasing, organic photovoltaics, to photochromic materials and molecular switches.

In our recent work, we have explored the effects of boron incorporation into conjugated oligomers and macrocycles. We have also demonstrated that directed electrophilic aromatic C-H borylation is an effective approach to luminescent B-N containing conjugated ladder compounds. Finally, we will show that interesting new functional materials are obtained when boron is embedded into polymers.