Polymer Program

INSTITUTE OF MATERIALS SCIENCE

Seminar: 11:10 am Friday, March 24

IMS room 1002

Host: Yang Qin

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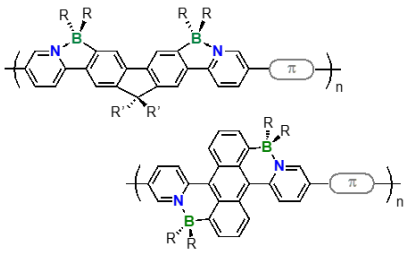
B-N Lewis Pairs as Versatile Motifs in Polymeric Materials

Abstract: The incorporation of main group elements into polymeric materials is frequently exploited to achieve unusual properties and to enable new functions For instance, tricoordinate boron's participation in π-delocalization can have a dramatic effect on the optical properties by selectively lowering the LUMO orbital levels. The electron-deficient character of boron also enables dynamic Lewis acid-base interactions, which trigger strong perturbations of the electronic structure. The products have been studied for applications ranging from imaging, lasing, organic photovoltaics, molecular switches, to supramolecular materials.

Our group has developed versatile approaches for incorporation of borane Lewis acids and Lewis pairs into conjugated molecular, macrocyclic and polymeric materials. We have also demonstrated that Lewis base-directed electrophilic aromatic C-H borylation effectively generates B-N Lewis pair-functionalized conjugated materials with exciting properties and potential applications in organic electronics and the biomedical field. Furthermore, we have pioneered the selective attachment of borane Lewis acids and Lewis pairs to polyolefins through direct polymerization and post-polymerization modification approaches. These polymers are finding applications as supported catalysts and as building blocks of dynamic polymers.

In this talk, I will discuss some of these discoveries, highlighting the effect of B-N Lewis pair functionalization on the material properties and the impact in diverse application fields.

Intramolecular B-N Lewis Pairs



Intermolecular B-N Lewis Pairs