

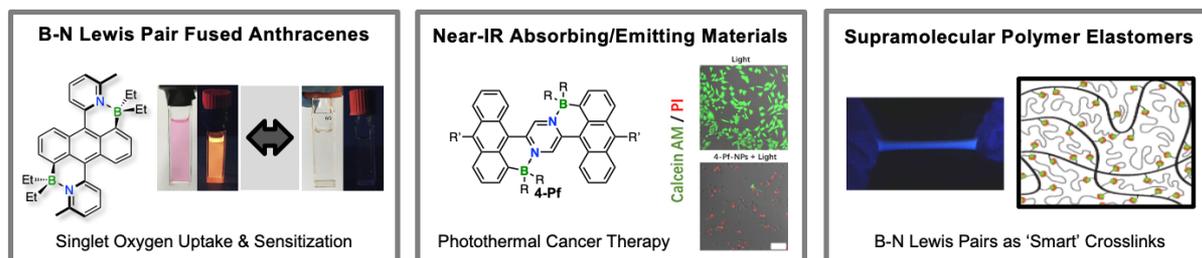
Borane Building Blocks In the Design of Innovative Molecular and Polymeric Materials

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Abstract. The incorporation of main group elements into molecular and polymeric materials is frequently exploited to achieve unusual properties and enable new functions. For instance, tricoordinate boron's participation in pi-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 and enable assembly of novel supramolecular materials. Our group has developed versatile approaches for incorporating borane Lewis acids and Lewis pairs into conjugated molecular, macrocyclic, and polymeric materials with a view to potential applications in organic electronics, sensing, (photo)catalysis, bioimaging, and therapeutics. In this talk, I will discuss some of our recent efforts to develop intramolecular B-N Lewis pair-functionalized polycyclic aromatic hydrocarbons (PAHs) and to leverage dynamic intermolecular B-N Lewis pairs as crosslinks in network polymers.



Biography: Frieder Jäkle is a Distinguished Professor in the Department of Chemistry at the Newark Campus of Rutgers University. He received his Diploma in 1994 and Ph.D. in 1997 from TU München, Germany, under the direction of Prof. Wagner. After a postdoctoral stint with Prof. Manners at the University of Toronto he joined Rutgers University in 2000. From 2018-2025 he served as the Chair of the Chemistry Department at Rutgers University - Newark. His research interests revolve around main group chemistry as applied to materials and catalysis, encompassing projects on organoborane Lewis acids, conjugated hybrid materials, luminescent materials for optoelectronic and sensory applications, stimuli-responsive and supramolecular

polymers. He is the recipient of an NSF CAREER award (2004), Alfred P. Sloan fellowship (2006), *Friedrich Wilhelm Bessel Award* of the Alexander von Humboldt Foundation (2009), ACS Akron Section Award (2012), Boron Americas Award (2012), and Board of Trustees Research Award of Rutgers University (2017). In 2019 he was named a *Fellow* of the American Chemical Society, in 2024 an Ambassador to the French CNRS, and in 2026 an awardee of the Zen-ichi Yoshida lectureship by IOCF (Kyoto, Japan).