IBS Seminar

Electrophilic Carbenes: Tales of Main Group Chemistry, Radicals, and Photochemistry

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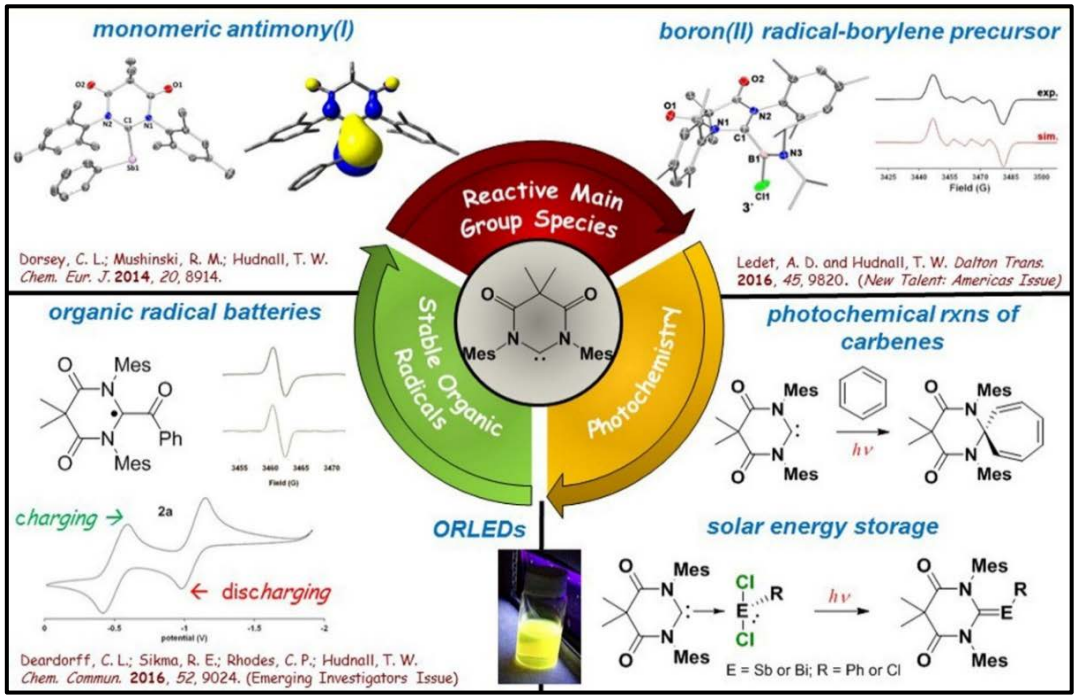
For the past five years we have been exploring the chemistry of electrophilic, or more appropriately π-acidic, carbenes as ligands toward p-block elements. Our initial efforts were in the realm of structure and bonding of low-valent main group species supported by carbonyl-decorated carbenes, specifically diamidocarbenes (DACs) and mono(amido)amino carbenes (MAACs) as ligands.[1-4] More recently, our work has focused on the photochemistry of electrophilic carbenes, and main group fragments supported by these ligands. This presentation will describe our development of the chemistry of electrophilic carbenes and will highlight the following topics: *i*) the synthesis of the first examples of P_8 allotropes,[1] stibinidenes (Sb-R),[3] and borylenes (B-R)[4] supported by DACs and MAACs, *ii*) the redox chemistry of a-acyl amidinium cations,[5] *iii*) the photochemistry of organic radicals and biradicals derived from electrophilic carbenes,[6] and *iv*) the photochemistry of DACs. In addition to describing the synthesis of these compounds, their potential application as novel emissive and energy storing materials will also be discussed.



1. Dorsey, C. L.; Squires, B. M.; Hudnall, T. W., Isolation of a Neutral P8 Cluster by [2+2] Cycloaddition of a Diphosphene Facilitated by Carbene Activation of White Phosphorus. *Angew. Chem., Int. Ed.* **2013,** *52* (16), 4462-4465.
2. Rodrigues, R. R.; Dorsey, C. L.; Arceneaux, C. A.; Hudnall, T. W., Phosphaalkene vs. phosphinidene: the nature of the P-C bond in carbonyl-decorated carbene --> PPh adducts. *Chem. Commun.* **2014,** *50*, 162-164.
3. Dorsey, C. L.; Mushinski, R. M.; Hudnall, T. W., Metal-Free Stabilization of Monomeric Antimony(I): A Carbene-Supported Stibinidene. *Chem. – Eur. J.* **2014,** *20* (29), 8914-8917.
4. Ledet, A. D.; Hudnall, T. W., Reduction of a diamidocarbene-supported borenium cation: isolation of a neutral boryl-substituted radical and a carbene-stabilized aminoborylene. *Dalton Trans.* **2016,** *45* (24), 9820-9826.
5. Deardorff, C. L.; Eric Sikma, R.; Rhodes, C. P.; Hudnall, T. W., Carbene-derived α-acyl formamidinium cations: organic molecules with readily tunable multiple redox processes. *Chem. Commun.* **2016,** *52* (58), 9024-9027.
6. Neier, E.; Arias Ugarte, R.; Rady, N.; Venkatesan, S.; Hudnall, T. W.; Zakhidov, A., Solution-processed organic light-emitting diodes with emission from a doublet exciton; using (2,4,6-trichlorophenyl)methyl as emitter. *Organic Electronics* **2017,** *44*, 126-131.

■ DATE & TIME: October 24th (TUE) 15:30 PM – 16:30 PM
■ PLACE: Chemistry Bldg, #310, POSTECH
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