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Department of Chemistry

Special Seminar

4 p.m. Wednesday, September 17, 2014 • 331 Smith Hall

Professor

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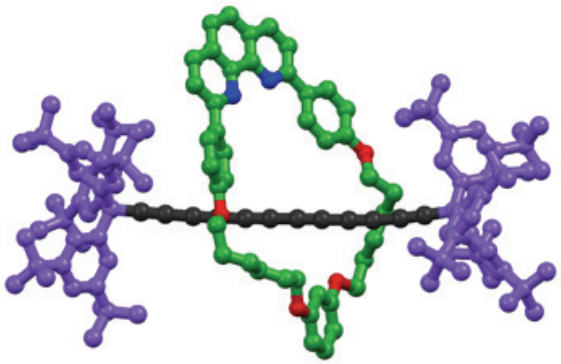
Cumulenes, Polyynes, and Rotaxanes for the Study of Carbyne

Website:
https://www.chemie.uni-erlangen.de/dcp/forschung/arbeitskreise/ak-tykwinski/the-boss/

Abstract



The rigid and linear geometry of polyynes make them outstanding building blocks for the construction of conjugated scaffolds for use in the formation of, for example, molecular wires. Polyynes with defined length also serve as model compounds for the carbon allotrope carbyne (the polymer/material constructed of sp-hybridized carbon), and we have synthesized a variety of such species to explore the properties of carbyne.[1] Using the same general synthetic methods we now examine the "other" class of compounds that are based on sp-hybridized carbon, namely the cumulenes.[2] In addition to new synthetic approaches and characterization, we have attempted to stabilize these reactive molecules through the use of mechanical bonds, which can provide "insulated" polyynes and cumulenes through rotaxane formation.[3] Our recent synthetic achievements toward sp-carbon based molecules will be briefly summarized. These model compounds are then used for a comparison of physical, electronic, and optical properties of cumulenes versus polyynes, especially as they relate to the allotrope carbyne.

[1] W. A. Chalifoux, R. R. Tykwinski, *Nature Chem.* **2010**, *2*, 967–971.
[2] J. A. Januszewski, D. Wendinger, C. D. Methfessel, F. Hampel, R. R. Tykwinski, *Angew. Chem.* **2013**, *52*, 1817–1821.
[3] L. D. Movsisyan, D. V. Kondratuk, M. Franz, A. L. Thompson, R. R. Tykwinski, H. L. Anderson, *Org. Lett.* **2012**, *14*, 3424–3426.

Host: Professor Thomas Hoye