Czech Chemical Society Lecture

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online lecture

Organobismuth Chemistry: Accessing Transition-metal Catalyst Surrogates and Novel Materials.

Jakub Hyvl

Department of Chemistry, University of Hawaii at Manoa

Main-group catalysis aspires to substitute the current transition-metal catalysts by elements with better sustainability and to extend the synthetic toolbox of organic reactions. Among the main challenges in this field are the few existing catalytic reactions, largely limited to phosphorus and boron-based systems. Recently, a lot of attention was aimed toward the redox organobismuth catalysis utilizing BiIII/BiV, BiI/BiIII and BiII/BiIII redox couples. However, our group developed redox-neutral process, selective olefin difluorocarbenation, catalyzed by organobismuth catalyst operating through hypervalent bonding activation. The mechanism of this reaction has been studied in detail revealing a unique reversible α-elimination of CF_2 from Bi-CF_3 moiety. Advancements in organobismuth materials chemistry originating from our group will be discussed in the second part of the talk.