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A radical approach: Paramagnetic Ni species in organometallic photocatalysis and electrocatalysis

ABSTRACT:

Paramagnetic Ni complexes have been proposed to play an important role in several organometallic reactions, as well as small molecule activation processes. In this context, a series of uncommon organometallic Ni(III) complexes relevant to cross-coupling reactions have been isolated and their catalytic reactivity was studied in detail. More recently, unique mononuclear Ni(I) complexes have been developed and their reactivity was probed for the first time. Finally, the intermediacy of such paramagnetic Ni species in two examples of photocatalytic C-O cross-coupling and an electrocatalytic hydrogen evolution reaction will be discussed.

BIO:

Prof. Liviu Mirica is the William H. and Janet G. Lycan Professor in the Department of Chemistry at the University of Illinois at Urbana-Champaign, USA. He received his B.S. degree in Chemistry from Caltech in 1999, and his Ph.D. in Chemistry from Stanford University in 2005. After an NIH postdoctoral fellowship at UC Berkeley, in 2008 he started his independent career at Washington University in St. Louis, and 2019 he moved to the University of Illinois. Prof. Mirica has made important contributions to chemistry, such as the design of flexible multidentate ligands that can stabilize transition metal ions such as Ni and Pd in uncommon oxidation states. He has also shown that these species are key intermediates in cross-coupling reactions and biomimetic oxidative and electrocatalytic transformations. Other contributions the development of novel therapeutic and diagnostic agents for Alzheimer's disease, including Cu-64 PET imaging agents for the neurotoxic beta-amyloid peptide oligomers.