

**Invited Lecture**  
**Inter-Disciplinary Explorations in Chemistry (I-DEC 2018)**

**Utilizing the Non-Innocence of Diamido-Benzenes for Stoichiometric and Catalytic Bond Activation Reactions**

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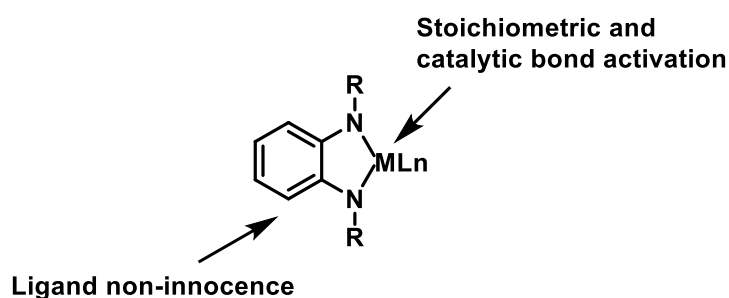
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**Abstract:**

Metal complexes of non-innocent ligands have fascinated chemists for several decades owing to their unusual electronic structures.<sup>1</sup> Investigations on such metal complexes have given rise to several new bonding concepts in chemistry.<sup>2</sup> Despite the aforementioned facts, the direct utility of non-innocent ligands in bond activation reactions and catalysis has only taken off in recent years.<sup>3</sup>

In this contribution, I will discuss several case studies from our laboratory with a focus on substituted diamido-benzene ligands.<sup>4,5</sup> Apart from a detailed analysis of their geometric and electronic structures, a large focus of this contribution will be on the tuning of the electronic and coordinative (un)saturation at transition metal centers through variations in the diamido-benzene ligands. We will discuss stoichiometric bond activation at transition metal centers that can be tuned through the non-innocence of the coordinated diamido-benzene ligands. Additionally, we will show the utility of metal complexes of such ligands in electrocatalytic dihydrogen splitting and in C-C bond formation reactions. Apart from synthetic details, a large focus of this presentation will be on the use of methods such as electrochemistry, UV-vis-NIR/IR/EPR spectroelectrochemistry, bulk electrolysis experiments and computational analyses to understand stoichiometric and catalytic bond formation reactions with such metal complexes.



**Figure:** Non-innocence at diamido-benzene and bond activation at the metal center.

**References and Notes:**

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**Bio-Sketch of Speaker**

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Biprajit Sarkar grew up in Assam and studied chemistry at the University of Delhi and at the Indian Institute of Technology Bombay. At the end of 2001 he moved to the University of Stuttgart, Germany to work on his doctoral thesis with Prof. Wolfgang Kaim which he finished in 2005. After a one-year post-doctoral stay in the laboratory of Prof. Pierre Braunstein, Biprajit moved back to Stuttgart to work on his habilitation. On completion of his habilitation at the end of 2011, Biprajit was offered Professor's positions at the Technical University Dresden and at the Freie Universität Berlin. He decided to take up the latter offer and moved to the FU Berlin at the beginning of 2012. Very recently he was offered a position at the University of Potsdam, which he declined and decided to stay on at the FU Berlin. Biprajit was selected as one of the "Rising Stars" at the ICCS 2014 in Singapore, and was awarded the Zasshikai Lectureship of the University of Tokyo in 2015. Since 2015 he has been a visiting professor at the IIT Bombay. His research interests are based on metal complexes of quinones, azo ligands, triazoles and mesoionic carbenes. Apart from synthetic chemistry, his group probes the utility of these metal complexes as magnetically and optically switchable molecular materials, as well as their utility in small molecule activation and catalysis.