Nickel Phosphite Precatalysts for C-S, C-C and C-N Bond Formation

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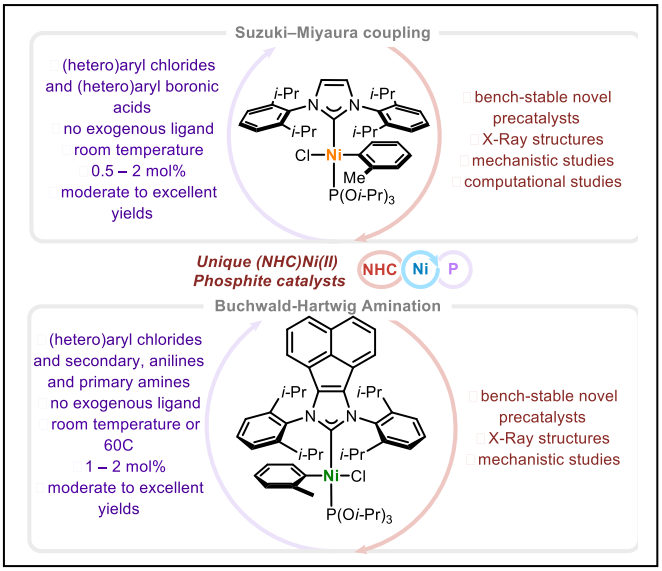
Modern chemical synthetic methods, involving organometallic catalysts, are highly prized in chemical industry and provide a multibillion-dollar driver for many economies. Traditional catalysis is often, expensive because of the reliance on rare earth metals, requires brute force (high temperatures and pressures) and produces significant waste materials. An ambitious aim of earth abundant transition metal catalysts (EAM) is to carry out organic reactions at low temperatures without additives, so the overall cost to chemical industry can be dramatically reduced. It is of central importance for modern chemical industry to establish new greener processes which save energy and reduce waste.

Nickel complexes are increasingly being developed as catalysts for cross-coupling reactions as a reactive and cost-effective alternative to palladium. In this presentation the rational design and synthesis of new inexpensive air-stable nickel based precatalysts will be discussed. The physical and chemical properties of these nickel complexes will be revealed along with their application in C-N, C-S and C-C coupling reactions. Importantly, the yields using these nickel precatalysts are comparable or improved with those achieved using the more commonly used $Ni(COD)_2$. The final section of the presentation will provide emphasis on room temperature reactions and mechanistic concepts when using these precatalysts.



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Scott Stewart *is an Associate Professor at The University of Western Australia. A/Prof Stewart completed a PhD at the Research School of Chemistry-Australian National University (ANU) with Prof. Martin Banwell. Following this, he was awarded an Alexander von-Humboldt Fellowship to work at the Universität Göttingen, Germany with Prof. Lutz Tietze. He has also worked in medicinal chemistry as a postdoctoral fellow at Monash University (with Prof. Peter Scammells) and Newcastle University (Prof. Adam McCluskey). He has been appointed at The University of Western Australia since late 2005. His current research interests include: Nickel, palladium and rhodium catalysts, Efficient synthesis of natural product ring systems, Domino reactions, and The medicinal chemistry of thalidomide and CNS active compounds.*
His awards include Japan Gateway Lectureship-Kyoto University Top Global Program, Japan Society for the Promotion of Science (JSPS) Fellowship, The RACI Athel Beckwith Award for Young Organic Chemists, Alexander von-Humboldt Fellowship, Jinan University-China Lectureship, A Talent Recruitment award of Guangdong-China, Kyoto University Foundation Invitation Fellowship, Tasmanian Alkaloids Lectureship. He has three patents, has published over 80 journal articles in journals such as Angew. Chem. Int. Ed., JACS, Organic Letters and Advanced Synthesis and Catalysis and has a h-index of 30.

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