

Title **Reaction mechanisms in inorganic homogenous catalysis
– time is of the essence**

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Date & Time Thursday, August 3, 2017 4:00 p.m.

Place I2CNER hall, I2CNER Bldg.1, Ito campus, Kyushu University

Abstract

The search for new and better reactivity has driven the development of 1st row transition metal catalysis over the last several decades, not least in the field of oxidation catalysis. Our group has focused on manganese and iron based catalysts for both fine chemical and bulk applications, and more recently on Ni(II) based catalysts, employing environmentally benign oxidants. A key challenge faced in catalyst development and in optimisation is to move from catalyst discovery to catalysis design. However, design requires understanding of the fundamental mechanisms that underpin catalysis. In this lecture I will discuss our recent efforts in elucidation of reaction mechanisms and the consequences of a lack of mechanistic understanding at the system level (i.e. considering all reaction components and their interplay) for efforts to deploy theoretical methods. The focus will be on a dinuclear iron system containing a non-redox innocent ligand (1), which was first reported over 15 years ago as well as some examples from manganese, nickel and palladium chemistry. In particular, the synergy that can be achieved between theoretical and experimental methods to delve deep into understanding not just the catalytic cycle but also the broader context of the catalytic reaction. The choice of spectroscopic techniques, and especially time resolution, used to study individual reactions will be emphasised.

About the Speaker

After completion of both BSc (1999) and PhD degrees (2002, under the guidance of Prof J. G. Vos, and for which Prof. Wesley Browne received the Young Chemists Award from the Royal Irish Academy) at the Faculty of Science and Health Dublin City University and a one year Post-Doctoral Fellowship jointly between DCU and Queens University Belfast, he moved to the Netherlands (2003), to take up a Postdoctoral fellowship and later a Senior Researcher position in the group of Prof Ben L. Feringa at the Stratingh Institute for Chemistry.

In 2007 he was awarded a VIDI innovational research award by the Netherlands Organization for Scientific Research to establish an independent research group and in 2008 was appointed as Assistant Professor of Molecular Systems and Interfaces with his research group focusing on responsive surfaces and homogeneous oxidation catalysis. In 2011 he was awarded a ERC-Stg(consolidator) grant by the European Research Council.

He was appointed in 2013 as Associate Professor of Functional Molecular Systems and Catalysts at Stratingh Institute for Chemistry of the University of Groningen (<http://www.rug.nl/research/molecular-inorganic-chemistry/browne/>) and in 2015 became Chair of Molecular Inorganic Chemistry and Chairman of the Board of the Stratingh Institute for Chemistry.

In 2016, he was awarded the Gouden Docent award (literally Golden Teacher) for his contributions to university chemistry education in the Netherlands by the Royal Netherlands Chemical Society. He is currently an advisory board member for the Chemical Communications, the European Journal of Inorganic Chemistry and Particle. To date he has authored and co-authored over 190 peer-reviewed articles and reviews and one patent.

Host: Professor Aleksandar Staykov

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