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Using light to remote control metal-coordination

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The ability to precisely control molecules with external stimuli is an important tool for various chemical systems such as catalysts, bio-active probes and host-guest systems. 1, An attractive approach to preparing materials that can be systematically controlled is the integration of tuneable "switches" into compounds, thus allowing the reversible conversion between two or more stable states. Various functions that can be regulated by stimuli-responsive switches include intramolecular energy transfer processes and valencetautomerism involving changes to magnetic properties. 2, External stimuli typically used in such materials include electrical and magnetic fields, 2 thermal treatment, 3 solvent composition changes, chemical addition and light exposure. 4 Despite the rich optical, magnetic and redox properties available to metal complexes, switchable systems that result in changes in the coordination environment of metal ions remain rare. Switchable complexes of this nature could act as efficient 'smart metal complexes' if the properties of the metal ion could be controlled using easily applied and highly selective external stimuli. Light is a particularly attractive stimulus for switching materials due to its non-intrusive and cost-effective nature. Optimisation and control of the switching function of photoactive metal complexes will require a comprehensive understanding of structure on the molecular scale, which can be efficiently achieved with the rapidly developing technique of photocrystallography – that is, the determination of a single crystal X-ray structure while simultaneously photo-irradiating the sample. 5

The aim of this work is to design, synthesise and characterise organometallic systems which incorporate a photochromic moiety where the coordination geometry of the metal-centre can be systematically regulated with light. To understand how these molecules function and the structural changes that occur upon photo-irradiation, precise atomic-scale information will be required for the materials both before and after switching. The MX1 and MX2 beamlines of the Australian Synchrotron will use to obtain this information.

References

1. Raymo, F. M.; Tomasulo, M. Chem. Soc. Rev. 2005, 34 (4), 327-336.
2. Hoque, J.; Sangaj, N.; Varghese, S. Macromolecular Bioscience 2019, 19 (1), 1800259.
3. Sato, O.; Tao, J.; Zhang, Y.-Z. Angew. Chem. Int. Ed. 2007, 46 (13), 2152-2187.
4. Berryman, O. B.; Sather, A. C.; Lledó, A.; Rebek Jr., J. Angew. Chem. Int. Ed. 2011, 50 (40), 9400-9403.
5. P. Coppens, Struct. Dyn.,2017, 4, 032102 , Coppens, P. and Fournier, B., J. Synchrotron Radiat., 2015, 22, 280– 287

Speakers Gender

Male

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No

Level of Expertise

Early Career <5 Years since PdD

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Yes

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