

CATCHING TRANSIENT INTERMEDIATES

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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,^[1] 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 the catalysis observed and the interplay of all reaction components. In this contribution I will focus on our efforts to track the formation and decay of transient intermediates and establish their relevance to the catalytic activity observed. In particular the challenges presented by mass transport and sampling rate in obtaining useful kinetic information.

1) S. K. Padamati, D. Angelone, A. Draksharapu, G. Primi, D. J. Martin, M. Tromp, M. Swart, W. R. Browne, *J. Am. Chem. Soc.* **2017**, *139*, 8718.