Shedding light on mechanisms in catalysis

Or
Trying to find a torch in a blacked out room to locate a box containing a dead black cat that is probably not even there

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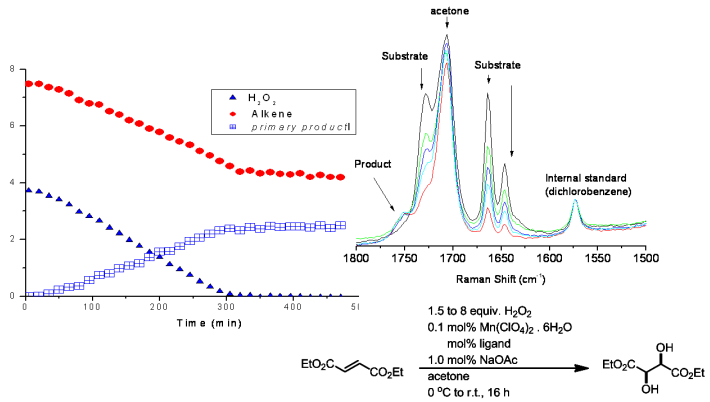
The search for new and better reactivity has driven the development of 1st row transition metal catalysis over the last several decades, not least in the field of oxidation catalysis. Over the last decade we have focused on manganese and iron based catalysts for both fine chemical and bulk applications, 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. I will discuss our recent work on how catalysis, spectroscopy and theory combine to allow us to delve deep into understanding not just the catalytic cycle but also the broader context of the catalytic reaction and how this has led to industrial applications.



Reaction monitoring with vibrational spectroscopy