

讲座摘要：

In this lecture Prof. Lee will outline his recent efforts, focused in the field of inorganic chemistry, investigating the self-assembly and self-organization of inorganic molecules and the engineering of complex systems and reaction networks that lead to the emergence of system-level behaviours. To do this Lee Cronin's group has developed new reaction techniques to control the assembly of nanoscale molecular metal oxide clusters, some of the largest non-biological molecules known, as well as new physical techniques e.g. the development of new cryospray and variable temperature mass spectrometry (for the elucidation of reaction mechanism and the observation of highly reactive intermediates) and new methods for synthesis using new reaction formats for complex and novel chemistry e.g. flow systems and 3D-printing .

1. 'Unveiling the Transient Template in the Self Assembly of a Molecular Oxide Nano-Wheel', *Science*, **2010**, 327, 72-74. DOI: 10.1126/science.1181735.
2. 'A flow-system array for the discovery and scale up of inorganic clusters' *Nature Chem.*, **2012**, 4, 1037-1043. DOI:10.1038/nchem.1489
3. 'Observation of Fe(V)=O using variable temperature mass spectrometry and its enzyme-like C-H and C=C oxidation reactions.' *Nature Chemistry*, **2011**, 3, 788. DOI: 10.1038/nchem.1132
4. 'Integrated 3Dprinted reactionware for chemical synthesis and analysis', *Nature Chem.*, **2012**, 4, 349-354. DOI :10.1038/nchem.1313
5. 'Configurable 3D-Printed millifluidic and microfluidic 'lab on a chip' reactionware devices', *Lab on a chip*, **2012**, 12, 3267-71.

The quality of Lee Cronin's work is reflected in his publication record: **>235 papers**, including **9 in Nature group / Science**, **ca. 55 in Angew. / J. Am. Chem. Soc.**

Prof. Lee Cronin 个人简介

2009-present: Gardiner Professor, Uni. of Glasgow; 2006-2011; Professor of Chemistry, Uni. of Glasgow; 2005-2006: Reader, Uni. of Glasgow; 2002-2005: Lecturer at the Uni. of Glasgow; 2000-2002: Lecturer at the Uni. of Birmingham; 1999-2000: Alexander von Humboldt research fellow (Uni. of Bielefeld); 1997-1999: Research fellow (Uni. of Edinburgh).

His research achievements have been recognized by many awards including the 2012 RSC Corday Morgan, 2011 RSC Bob Hay Lectureship, a Wolfson-Royal Society Merit Award in 2009, Election to the Royal Society of Edinburgh in 2009, the 2008 Morino Foundation Lectures, a 2007 Philip Leverhulme Prize (£70,000), Nexus

young scientist award in 2006.

The focus of Cronin's work is understanding and controlling self-assembly and self-organization in Chemistry to develop functional molecular and nano-molecular chemical systems; linking architectural design with function and recently engineering system-level functions (e.g. coupled catalytic self-assembly, emergence of inorganic materials and fabrication of inorganic cells that allow complex cooperative behaviours). Much of this work is converging on exploring the assembly and engineering of emergent chemical systems. One target is the development of 'inorganic biology' i.e. a biological system beyond the naturally occurring 'organic biology' found on planet earth. Not only does this have ramifications for the origin of life on earth, elsewhere in the universe, the realisation of a living system assembled from the bottom up would also lead to a range of new technologies. To achieve his aims, Cronin and his group regularly collaborate with Physical, Theoretical, Organic, Materials, and Biological Chemists as well as Scientists in Chemical and Electrical Engineering, Physics and Medicine. It is also worth pointing out that the expertise in the Cronin group is unique bringing together chemists, chemical engineers, reaction modelling, complex system modelling, evolutionary theory, synthetic biology, robotics and AI.

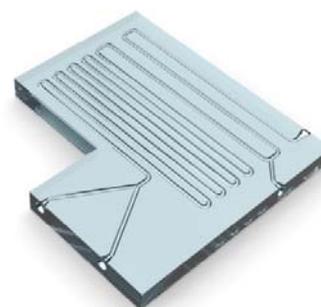
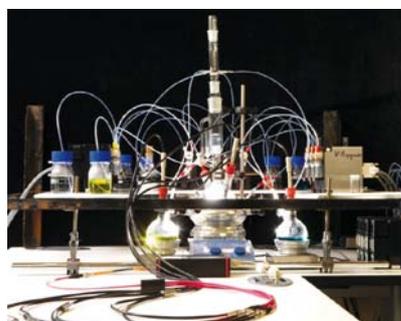


Figure: New reaction formats for complex chemistry