Department of Chemistry
College of Science

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Seminar

Monday 12 September 2011

11.00 am - Room 531

Dr Nigel T. Lucas

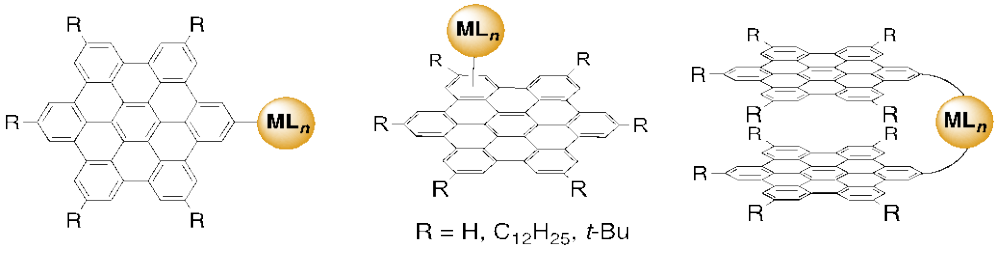
Synthesis and Supramolecular Chemistry, Department of Chemistry, University of Otago

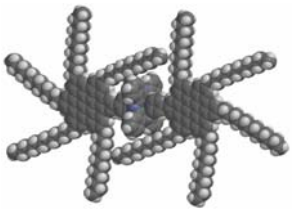
Well-defined, Soluble Synthetic Graphenes and Graphene-Metal Complexes

'Graphene' describes a single-atom thick, 2D honeycomb network of carbon atoms that are the layers that constitute the carbon allotrope graphite. Interest in the study of graphene materials has grown significantly in recent years as graphene sheets offer extraordinary electronic, thermal and mechanical properties that may be exploited for a variety of applications.1 While graphene samples can be accessed in a 'top-down' approach by mechanical exfoliation of graphite, the synthetic chemist uses a 'bottom-up' approach building graphenes from arene precursors. Total synthesis provides access to graphene-like large polycyclic aromatic hydrocarbons (PAHs) that can be well-defined with regard to size and shape, and monodisperse.2

One of the difficulties in dealing with larger PAHs is that solubility decreases with increasing size, primarily as a result of the strong aggregation of the discs through π-stacking type interactions. When solubilised with long alkyl chains, these disc-like molecules self-assemble into columnar liquid crystalline mesophases that have shown promise as semiconductor materials.2

The strong stacking interaction between graphenes is one attribute that has prompted us to investigate such molecules (and their functionalised derivatives) as ligands for metal complexation. The graphene moiety typically drives the arrangement of the ligand and its metal complexes in the bulk and on surfaces, often resulting in long range order.3 The synthetic and supramolecular chemistry of graphenes, graphene-based ligands and complexes, along with their solution, solid-state and surface organisational properties, will be discussed.





1. M. J. Allen, V. C. Tung, R. B. Kaner, Chem. Rev. 2010, 110, 132.
2. J. Wu, W. Pisula, K. Müllen, Chem. Rev. 2007, 107, 718.
3. N. T. Lucas, H. M. Zareie, A. M. McDonagh, ACS Nano 2007, 1, 348.

ALL WELCOME For further information : phone 364 2100

ALL WELCOME For further information : phone 364 2100