
The 199th iCeMS SEMINAR

Wed 27 Jan 2016
16:00-17:30

**Organometallic Chemistry for the Preparation
of Chiral Molecules through Cross Coupling Chemistry
and in the Development of Novel Ligands
for Self-Assembled Monolayers on Gold**

Lecturer: **Prof Cathleen Crudden**
Department of Chemistry
Queen's University

Venue: 2nd Floor Seminar Room
iCeMS Main Building, Kyoto University

We will describe the development of an enantiospecific Suzuki-Miyaura reaction and how this is employed in the synthesis of complex molecules that are difficult to make by other methods. Under optimized conditions, this reaction takes place with complete control of stereochemistry and can be used in the synthesis of multiply arylated organic molecules that have high biological activity.

The use of N-heterocyclic carbenes to modify homogeneous metal catalysts is widespread, however despite the versatility of these complexes, the high metal-NHC bond strength and oxidative stability of NHC-ligated metals, and the ease of synthesis of NHCs, there have been only a handful of reports of mostly ill-defined surfaces functionalized by NHCs.

In the second half of the talk, we will describe the first example of the synthesis of gold surfaces, both Au(111) and Au nanoparticles, modified by common N-heterocyclic carbenes. In particular, films prepared by the deposition of NHCs show molecular ordering on the surface and remarkable stability. They show no decomposition upon heating for 24 hrs in THF, in boiling in water for 24hrs or upon treatment with acid (pH 2) or base (pH 12). Incredibly, they even survive largely after 24 hr exposure to hydrogen peroxide. This remarkable increase in stability relative to thiol-based SAMs will greatly increase the number of reagents and conditions to which the SAMs can be exposed.

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