

Metal nanoparticles for applications in Catalysis and Nanotechnology

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-12.15pm-

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- Abstract -

Metal nanoparticles, i.e. particles of metal with spatial dimensions on the nano-scale (10^9 m) bridge the gap between bulk materials and individual atoms or ions. Extremely high surface areas and high ratios of metal atoms occupying positions on or close to the surface and presence of various types of active sites make such nanoparticles ideal candidates as key components of catalyst systems. Chemists strive to control chemical composition, particle size (quantum-size effect can play an important role) and internal structure of the nanoparticles (such as alloyed or layered mixed-metal systems) in order to achieve a better understanding of structure-activity trends. Catalysts based on mixed-metal nanoparticles often outperform monometallic analogues due to the synergetic effect (i.e. presence of more than one type of metal atom in the system significantly enhances activity and selectivity).

This presentation will outline approaches to fabrication of metal nanoparticles using clusters and colloids as precursors with pre-formed metal core and use of the resulting nanoparticles as catalysts. Firstly, we use this approach in the development of novel nanoparticle-based heterogeneous catalysts for applications in chemical catalysis (several examples of recently studied catalyst systems will be discussed).

Finally, use of metal colloids as catalysts for growth of carbon nanotubes and nanofibres using plasma enhanced chemical vapour deposition will be discussed with focus on fabrication of:

- Uniform vertically aligned carbon nanofibres over large flat substrates at low temperatures;
- Carbon nanofibres densely covering three dimensional matrices;
- Arbitrary arrays of vertically aligned carbon nanotubes.

- Venues -

Rankine Brown 106, Victoria University of Wellington
Level 1, Psychology Building, University of Canterbury

Teaching Facilities, South West corner, Information Services Building, University of Otago
Rm 411, Dept of Chemistry, Chemistry Building 301, University of Auckland, 23 Symonds St



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