MacDiarmid Video Conference Seminar

Why Sea Urchins And Calcium Carbonate? Towards Three-Dimensional Hierarchical Solid State Synthesis

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-12.15pm-
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-Abstract-
Nature prepares for us a smorgasbord of materials. A large percentage of the dishes are minerals, with silica and calcium-based systems being the most prevalent. Looking more closely at this subset, a differentiation can be found with respect to minerals formed under geological conditions and those synthesized in a biological environment – the so-called biominerals. The latter, while being chemically similar to the geological class, are generally tailor-made with specific size characteristics, have enhanced physical properties, such as resistance to corrosion, durability and toughness and are synthesized under benign conditions. Further, biominerals can have three-dimensional patterning, which in the most impressive cases extends from and transforms over (hierarchical structure) the sub-nanometre to metre length scales, often encompassing porosity. Examples of such biominerals are mammalian bone and sea urchin spines. Both are calcium-based materials. The former is an amorphous phosphate-based system while the latter is a crystalline carbonate-based mineral.

Our research on biomineral formation or more generically hierarchical materials synthesis is couched in the calcium carbonate family of materials and the formation of sea urchin spines. The focus is a molecular one with our aim being to develop an understanding of structure/function relationships, nucleation and growth mechanisms, kinetic factors and the role of self-assembly. In this talk I will introduce the area, outline the methods we are utilising, summarise where we currently are and outline what we are trying to accomplish.

Venues
- Rankine Brown 106, Victoria University of Wellington-
-Video Conference Room, C-Block, IRL, Gracefield Site, Lower Hutt-
-Level-3 lecture theatre (A309), ELEC Dept Building, Canterbury University-
- Turitea R1.07, Massey University-
-Conference Room 2, Otago University-

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