MONASH University

MONASH CENTRE FOR ELECTRON MICROSCOPY

SEMINAR

Measurements and modelling of short range order in disordered solids

Dr Timothy Petersen

University of Sydney
Electron Microscope Unit

Wednesday 16 December, 2009
11.00am – 12 noon
Science Lecture Theatre S11, Building 25

Abstract

In crystallographic terms, the atomic arrangement of disordered solids is often described as 'amorphous', which implies the absence of structure. However atoms cannot completely overlap and interactions inevitably give rise to structural correlations, so no material is completely amorphous. The absence of both 'long range order' and crystallographic symmetry in disordered solids defines what is commonly referred to as 'short range order'. Techniques such as x-ray and neutron diffraction are most efficient at probing this local structural (and even temporal) ordering; having been established for well over 50 years. Equivalent diffraction measurements in the Transmission Electron Microscope (TEM) are less common but perhaps more advantageous for measuring statistical pair correlations due to short range structural order. Much like liquids, many disordered solids are homogenous and isotropic and so the structural pair correlations can be succinctly described by a "radial distribution function". Mere interpretation of atomic structure in terms of the radial distribution function is challenging and ill-posed, which has driven some researchers to model the diffraction data. This talk will summarise some efforts in this area and also discuss the merits of TEM based measurements of short range order for a range of interesting materials such as fullerene and diamond-like carbons, amorphous silicon, metallic glass and coal chars.

Convenor: Associate Professor Joanne Etheridge
Email: joanne.etheridge@mcem.monash.edu.au

Visitors are most welcome: Please note that there is a designated Visitors Car Park (N1) clearly ground-marked by white paint and tickets, at a cost of $1.4/hour for up to 3 hours, available from a dispensing machine. This high-rise carpark is located on the following Clayton Campus Map, Ref. B2.

Printable version of the Clayton campus map (pdf 833 kb) (Please right click to open link)