

## “Phase transitions in aperiodic composite materials.”

*Friday, 23 May 2014 14:30 (30 minutes)*

Supramolecular or self-assembled materials often result from a subtle balance of weak intermolecular interactions yielding to a large variety of ordered and disordered phases with many different physical, chemical or mechanical properties. Alkane urea inclusion compounds (UIC) are molecular composite structures where a “host” framework of urea molecules accommodates “guest” alkane molecules as long chains loosely held in a honey-comb like hexagonal network of adjacent channels. Most of the alkane-UICs are incommensurate or aperiodic, which means that the ratio of the host and guest periodicities is not a rational number  $P/Q$ . As a consequence, very different types of short and long range ordering, as well as different phase transitions take place in these alkane-UICs just by changing the length of the alkane molecules. Even if these compounds are aperiodic by construction, periodicity can be recovered in superspaces of dimension greater than 3 and where full

power of Fourier analysis can be used for crystallographic investigation. Alkane-UICs can be viewed as prototype compounds for which complementary use of Bragg and diffuse scattering on one hand and inelastic scattering (x-ray or neutron) and field gradient solid state NMR on the other hand can be carried on to study fluctuations around phase transitions in order to better characterize ordering mechanisms in organic crystals.

**Primary author:** Mr MOHAMMED, Ahmed (Rennes University)

**Presenter:** Mr MOHAMMED, Ahmed (Rennes University)

**Session Classification:** Student Sessions