

Chain Melting at HT/HP in Incommensurate Rb-IV

Malcolm McMahon, Lars Fahl Lundegaard, Clivia Hejny, Sara Falconi, Richard Nelmes, *School of Physics and Centre for Science at Extreme Conditions, The University of Edinburgh*. E-mail: mim@ph.ed.ac.uk

Rb-IV is the stable high-pressure phase of rubidium between 16 and 21 GPa. The structure of Rb-IV has long been known to be complex, but it is only recently that it has been solved as being an incommensurate host-guest composite structure [1], comprising a tetragonal host framework containing chains of "guest" atoms that form structures incommensurate with the host. While we have observed similar composite structures in a number of other elemental metals [2], these structures all have an 8-atom host framework, while the host structure in Rb-IV contains 16-atoms. Rb-IV is also unique in that on pressure decrease below 16.3 GPa at 300 K, the chains of guest atoms become disordered and liquid-like [3]. We have recently investigated the P-T dependence of this "melting" transition, and in this poster we will present the stability field of the disordered chain phase, combining it with previous data on the P-T phase diagram of Rb up to 14 GPa.

[1] McMahon M.I., Rekhi S., Nelmes R.J., *Phys. Rev. Lett.*, 2001, **87**, 055501.

[2] McMahon M.I., Nelmes R.J., *Z. Kristallogr.*, 2004, **219** 742. [3] McMahon M.I., Nelmes R.J., *Phys. Rev. Lett.*, 2004, **93**, 055501.

Keywords: high-pressure crystallography, rubidium, disorder