

Supramolecular interactions in the solid state: flexibility, frustration, and function

Andrew Goodwin

University of Oxford, Inorganic Chemistry Laboratory, UK
andrew.goodwin@chem.ox.ac.uk

Conventional solid materials are typically held together by strong interactions, such as electrostatics and covalent bonds. The strength of these interactions confers stability, which is often desirable. But in developing responsive materials — compounds that change their shape or nature in reaction to subtle variations in environment or composition — stability can actually be entirely undesirable. This talk will focus on two systems where the presence of weak supramolecular interactions has allowed us to engineer materials with extreme and counterintuitive responses: namely, zinc dicyanoaurate [1] and the family of silver/gold cyanides [2]. In both cases, synchrotron X-ray powder diffraction measurements have been crucial in developing a microscopic understanding of the unusual physicochemical behaviour at play.

References

[1] – A. B. Cairns, J. Catafesta, C. Levelut, J. Rouquette, A. van der Lee, L. Peters, A. L. Thompson, V. Dmitriev, J. Haines, A. L. Goodwin, *Nature Materials* 12, 212–216 (2013).

[2] – A. B. Cairns, M J Cliffe, J. A. M. Paddison, D Daisenberger, M. G. Tucker, F.-X. Coudert, A. L. Goodwin, *Nature Chemistry* (2015, in press).