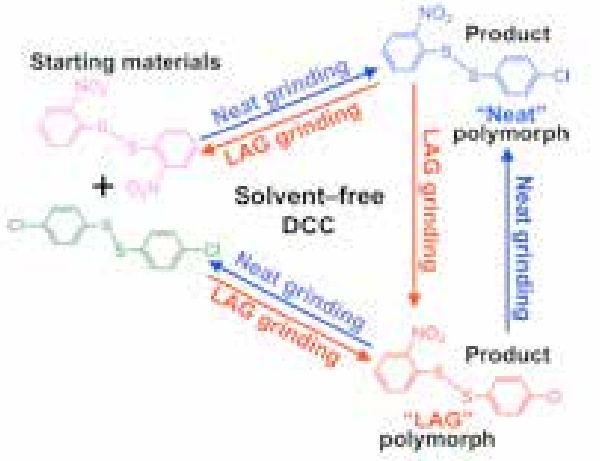
[MS46-02] Solid-State Dynamic Covalent Chemistry: a Combined Powder X-Ray Diffraction and Chromatography Study of Mechanochemistry Kinetics. Giulio I. Lampronti[a], Ana Belenguer[b], Jeremy K.M. Sanders[b] and Simon A.T. Redfern[a]

[a] *Department of Earth Sciences, University of Cambridge, Downing St, Cambridge, CB2 3EQ, United Kingdom*
[b] *Department of Chemistry, University of Cambridge, Lensfield Rd, Cambridge, CB2 1EW, United Kingdom*
E-mail: gil21@cam.ac.uk

Solvent-free synthesis techniques often provide fast and quantitative routes to the preparation of novel crystalline compounds [14]. When applied to dynamic covalent chemistry (DCC), mechanical grinding can lead to completely different equilibrium compositions from those obtained in solution [5-6]. We present here a case of base-catatysed metathesis of aromatic disulfides, where the emergence of three different polymorphs makes powder diffraction necessary for the quantitative study of the solid mixtures. The crystal structure of a new heterodimer product polymorph was solved by powder diffraction data. The kinetics of the transformation via mechanical dry (neat) and liquid assisted grinding (LAG) was experimentally studied combining XRD and chromatography.



The solvent-free DCC system here studied exhibits unexpected and rich behaviours, including the remarkable observation that under appropriate conditions the conversion from one polymorph to the other proceeds through reversible covalent chemistry intermediates.

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