

## Crystal engineering with multi-component crystals

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Multi-component crystals, which include salts, co-crystals and solvates, are the focus of much research in crystal engineering. This presentation will give an overview of the work done in our laboratory, which focusses on multi-component crystals of several classes of organic materials.

We have studied organic salts for their potential as porous materials, using both conventional solution-based methods and mechanochemistry. Most recently, we are investigating the use of sublimation as a route to prepare multi-component crystals.<sup>1</sup> Unexpectedly, we have found that organic salts can be crystallised by sublimation,<sup>2</sup> as well as hydrates.<sup>3</sup> These underexplored crystallisation methods provide a route to potential new multi-component crystal forms with different properties.

Our group has also investigated crystal engineering with thiazyl radicals. We focus on 1,2,3,5-dithiadiazolyl radicals (DTDAs), R-CNSSN<sup>•</sup>, which are of considerable interest due to their potential as building blocks for materials with interesting magnetic or conducting properties.<sup>4</sup> We have explored co-crystal formation as a way to overcome dimerisation in DTDAs,<sup>5</sup> and have shown that co-sublimation of DTDAs allows for control of the morphology and polymorphic form of a monomeric DTDA radical.<sup>6</sup> We have also investigated the inclusion of DTDAs in porous materials.<sup>7</sup> Most recently, we have probed the behaviour of crystalline DTDAs under pressure, with intriguing results.

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