

## MS34 Crystallization Techniques and chemical reactions driven by solid state interactions

MS34-05

Synthesis of spin crossover (SCO) complexes through accelerated aging contact reactions

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### Abstract

Accelerated aging (AA) refers to diffusion-controlled reactions between initially solid materials which are effected by mild changes to their environment. Zeolitic imidazolate frameworks (ZIFs), metal organic frameworks (MOFs), nanoparticles and more have been made using AA.<sup>1</sup> SCO complexes can switch between high spin (HS) and low spin (LS) states when exposed to external stimuli such as light, heat or pressure.<sup>2</sup> This change in spin state is often accompanied by a dramatic change of colour as well as changes to the magnetic and structural properties. For this reason they have applications as sensors. The inexpensive and facile nature of AA syntheses will allow for cheap largescale production of these sensors. Relative humidity (RH) and reactant hygroscopy have both been reported as important mechanistic factors.<sup>1,3</sup> Here we show the synthesis of SCO active materials and a copper analogue through accelerated aging and show our initial mechanistic investigations into the effect of hygroscopy and relative humidity on these reactions which reveals that the rate of reaction is dependent on atmospheric moisture.

The most recent research on these AA reactions and their products will be presented. Their potential in regards to the creation of novel materials that cannot be made with solution-state reactions will be discussed, as well as results of the investigation into the roles of hygroscopy and humidity as the possible driving forces behind these solid-state reactions.

### References

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- 2 - O. Kahn, *Curr. Opin. Solid State Mater. Sci.*, 1996, 1, 547–554.
- 3 - J. L. Do and T. Fréchet, *ACS Cent. Sci.*, 2017, 3, 13–19.

### Contact reaction of single crystals of reactants

