

Oral Contributions

[MS24] Organic and inorganic multicomponent crystals: structure and properties

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[MS24-01] Flexibility and Chemical Transformations in Network and Framework Materials. Lee Brammer, Iñigo J. Vitórica Yrezábal, Paul Smart, Jason R. Loader, Anthony J. H. M. Meijer.

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Examples from our work on coordination polymers and network materials (e.g. MOFs) will be used to illustrate the flexibility in these crystalline solids that enables chemical transformations to take place [1-4]. Two classes of compounds will be considered.

The first involves a family of highly fluorinated non-porous coordination polymers. We have shown that the alcohol molecules, which are coordinated to the metal centres, can be removed and reinserted at close to room temperature, despite the lack of porosity in the crystals and the need for changes in metal-carboxylate coordination [1,2]. These transformations occur in a single crystal-to-single crystal manner. Further heating of these materials induces further transformations, while still maintaining crystallinity. We have investigated these transformations and those involving other guest molecules by in situ powder diffraction, IR spectroscopy and TGA.

The second area of application is to pillared metal-organic framework (MOF) materials [3,4]. Here we have been able to exchange prepare a non-covalently pillared MOF. Exchange of pillar ligands leads to the possibility of a modular synthesis of pillared MOFs [4]. Reactions

have been followed spectroscopically and by X-ray powder diffraction, and modelled computationally leading to an understanding of the mechanism of chemical transformation.

References

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