

Metal-pyridine complexes for Nanostructured Materials

Coordination polymers/ MOFs

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Multidimensional metal-organic frameworks/ coordination polymers can be synthesized by a self-assembly reaction of metal salts and organic ligands (so-called building blocks).

The careful choice of the building blocks, the consideration of their geometry, topology and their influence on the crystal packing interactions enables understanding and control of the self-assembly processes in coordination polymer synthesis. When these aspects are well understood the specific construction of various multidimensional motifs can be achieved. The building blocks are often easily accessible and often require few synthetic steps to synthesize.

The building blocks self-assemble and form these structures without further influence of the scientist. With the right selection of building blocks and by careful consideration of conditions, like ratio, temperature and concentration it is possible to predefine the outcome of the self-assembly process. The outcome of the self-assembly reaction can lead to materials with unique and interesting properties. In this study 4,2':6',4"- and 3,2':6',3"-terpyridine[1] (tpy) ligands were synthesized and combined with various metal salts to obtain coordination polymers and MOFs with different dimensionality. The reaction of a tetratopic 4,2':6',4"-terpyridine ligand and ZnBr₂ yielded a two-fold interpenetrating 3D MOF with large hexagonal channels and a solvent accessible void space of 65% of the total volume (Fig. 1).[2]

The materials were investigated by SXRD and PXRD.

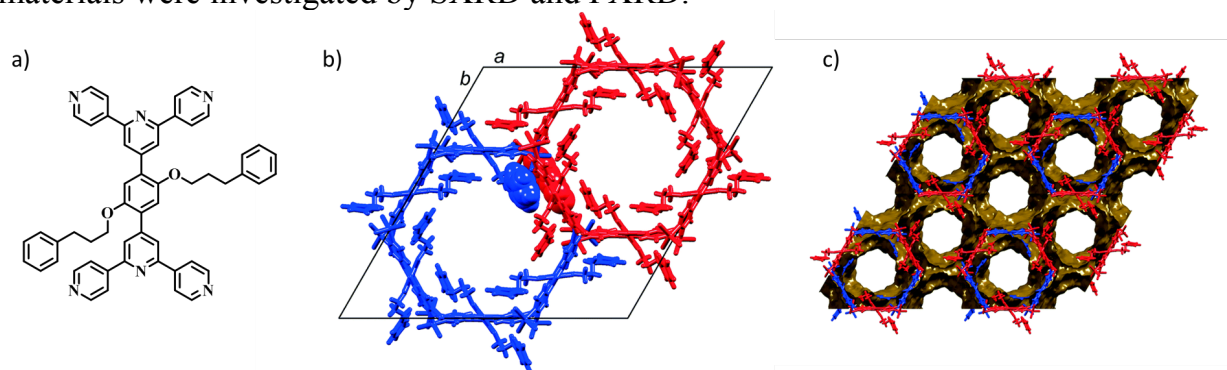


Fig.1: a) The tetratopic 4,2':6',4"-terpyridine ligand. b) View of the 2-fold interpenetrating channels along the c-axis. c) mercury representation of the void space (white) in the hexagonal channels.[2]

- [1] Y. M. Klein, A. Prescimone, E. C. Constable, C. E. Housecroft, *Aust. J. Chem.* 2017, 70, 468–477.
[2] Y. M. Klein, A. Prescimone, M. Neuburger, E. C. Constable, C. E. Housecroft, *CrystEngComm* 2017, 19, 2894–2902. DOI: 10.1039/C7CE00686A.