Lanthanide-based MOFs built on silicon-containing carboxylate ligands: Synthetic strategies and properties evaluation

[1]Mirela-Fernanda Zaltariov, [1]Mihaela Avadanei, [1]Georgiana-Oana Turcan-Trofin, [1]Angelica Vlad, [1]Maria Cazacu, [1]Sergiu Shova

[1] *Inorganic Polymers Department, "Petru Poni" Institute of Macromolecular Chemistry, Aleea Gr. Ghica Voda 41A, 700487 Iasi, Romania*

This study shows that using two different polycarboxylate ligands: bis(*p*-carboxyphenyl)diphenylsilane and tri(*p*-carboxyphenyl)phenylsilane, in combination with control of synthetic parameters such as solvents, temperature and metal ions (*f*- block elements) could lead to new porous materials with interesting structures and properties (figure 1). Such compounds show excellent structural properties due to the special arrangement of the polynuclear clusters (SBUs) resulting in a diversity of structural motifs as single crystal X-ray diffraction analysis revealed. The presence of the silicon atom with a higher polarizability could confer several advantages compared with their carbon analogues, the most important being the properties associated with the increased processability and solubility. The conformational flexibility of such ligands due to longer bond lengths than carbon analogues has been shown to have a great impact on the final architecture of the structure.

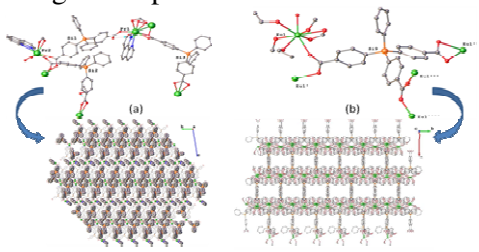

Figure 1. X-ray structures of MOFs based on bis(*p*-carboxyphenyl)diphenylsilane (a) and tri(*p*-carboxyphenyl)phenylsilane (a) and Pr(III) (a) and Eu(III) ions (b)

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