

# Hydrophobic metal-organic frameworks with new fluorinated ligands

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The robustness and reactivity of a metal-organic frameworks depend on metal-ligand interactions, where the metal-containing clusters may be vulnerable to ligand substitution by water, leading to the framework collapse upon exposure to moist air. This instability limits the practical uses of many MOFs. In order to further enhance the stability of the framework, many different approaches. One of the approaches to synthesize moisture-stable MOFs is use of hydrophobic linkers. The fluorinated MOFs are such option [1].

A novel fluorinated lanthanide-based metal-organic frameworks (Ln-F-MOFs) were constructed from the deprotonated 3,3'-difluorobiphenyl-4,4'-dicarboxylic acid (**H<sub>2</sub>L1**) or the deprotonated 3,3'-bis(trifluoromethyl)-[1,1'-biphenyl]-4,4'-dicarboxylic acid (**H<sub>2</sub>L2**), see Fig. 1a [2]. Using the acids H<sub>2</sub>L1 or H<sub>2</sub>L2 and lanthanide ions, the complexes with the composition {[M<sub>2</sub>(**L1** or **L2**)<sub>3</sub>(DMF)<sub>2</sub>]·xDMF·yH<sub>2</sub>O}<sub>n</sub> (M= Dy, Tb, Ho, Er, Eu for **L1** and Ce, Pr, Nd, Gd, Eu for **L2**) were prepared.

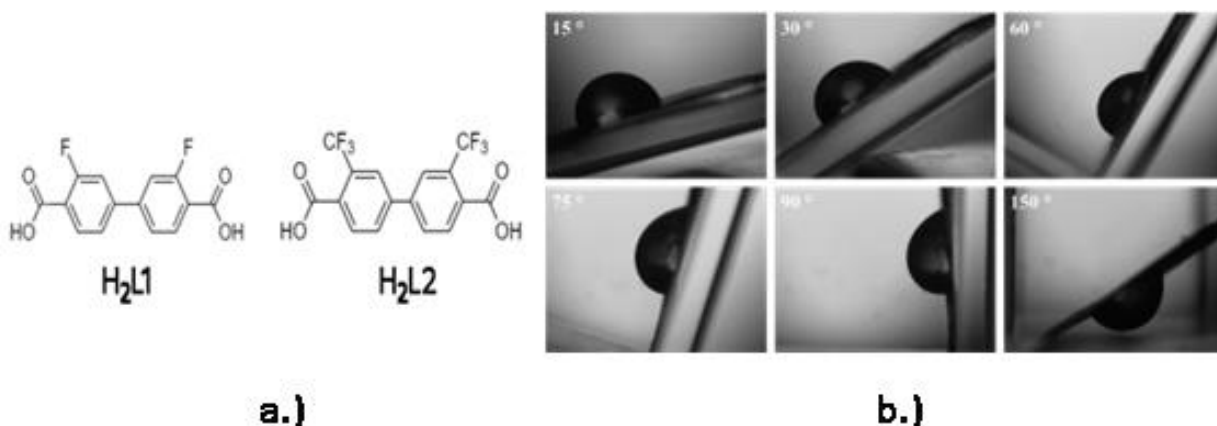


Fig. 1 a.) Structural formulas of acids H<sub>2</sub>L1 and H<sub>2</sub>L2. b.) Contact angle droplet test.

These complexes show high surface hydrophobicity with “rose petal effect” (see Fig. 1b), thermal stability up to 300 °C and photoluminescence properties determined the characteristic f-f transitions for the individual metal ions. The porosity of some activated coordination polymers was studied by N<sub>2</sub>, CO<sub>2</sub> and H<sub>2</sub> adsorption isotherms. In compounds containing Pr(III), Gd(III) and Eu(III), the magnetic properties were investigated. The detailed information will be presented at the conference.

## References:

1. M. Bosch, M. Zhang, H.-C. Zhou. Increasing the Stability of Metal-Organic Frameworks, *Advances in Chemistry*, (2014) 18232746.
2. D. Princík, V. Zelenák, J. Bednarčík, J. Elečko, J. Macko, T. Zelenka, R. Gyepes, E. Dutková, Novel fluorinated MOFs with hydrophobic properties, *Polyhedron*, (2023) 116739.

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