## MS16-P137 - LATE | NANOSTRUCTURED FLEXIBLE MOFS AND RELATED COMPOSITE MATERIALS

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Metal-Organic Frameworks or MOFs are crystalline porous solids that have been largely studied over the past two decades. Compared to classical porous systems (*e.g.*, porous carbon, mesoporous silica, and zeolite), MOFs possess a vast chemical versatility that provides them with unique properties such as large surface areas with tunable pore size and ample chemical functionalities.

Even more interesting is the variety of MOFs that possess the ability to respond to external stimuli such as solvent, gas pressure or temperature [1]. These flexible or breathing MOFs are capable of adapting their structure, resulting in dynamic characteristics that make them appealing in applications such as gas separation, controlled drug delivery, sensors and catalysis. The implementation of these flexible MOFs in functional deviceshas been hampered by their poor processability, since they have been typically obtained in the form of polycrystalline powders. A plausible solution for their practical use is their miniaturization in the form of nanoparticles, which, however, has been less explored.

We will first present a general protocol for the synthesis of nanostructured flexible MOFs using a microwave-based synthesis which permits to obtain 50 nm particle size of the material. Then, we will show how it is possible to exploit their surface characteristics to combine them with 2D materials presenting interesting electrical properties. In particular, we have developed a procedure to obtain a composite material based on exfoliated nanosheets of $MoS_2$ [2], and a flexible nanostructured MOF.

[1] C. Serre, C. Mellot-Draznieks, S. Surblé et al *Science* **2007**, *315*, 1828–1832.
[2] M. Morant-Giner, R. Sanchis-Gual, J. Romero et al *Adv. Funct. Mater.* **2018**, *28*, 1–11