



## Molecular luminescent probes to explore the pores and the surface of metal organic frameworks (MOF) drug carriers

<sup>1</sup> L. Boudjema, <sup>1</sup> P. Trens<sup>1</sup>, <sup>1</sup> D. A. Lerner

<sup>1</sup> *Institut Charles Gerhardt, CNRS UMR5253 ; Ecole Nationale Supérieure de Chimie de Montpellier, 240, avenue du Professeur E. Jeanbrau, 34296 Montpellier Cedex 05, France.*

### Introduction

In short, a metal–organic framework (MOF) is an extended coordination network obtained by the linking of identical units formed by a metal atom complexed by polydentate ligands. These microporous crystalline compounds possess cavities and windows. Small molecules may diffuse through the windows to fill the nanopores and interact with the ligands or escape from the pores. Most applications are in catalysis, gas separations or drug storage and release.<sup>1</sup> Much remains to understand the interaction of molecules with the inner and outer surface of MOFs. The preliminary work presented is centered on the use of selected fluorescent molecules to probe these surfaces and reveal the potential presence of different sites of adsorption on a well-known MOF named ZIF8.

### Materials and Methods

The probes used were anthracene and methyl orange. The results obtained are based on excitation and emission spectra analysis. ZIF8 was provided by BASF and used as received without any purification. As the windows of MOFs are generally too small to let in these rather large molecules to probe the inner surface, a classical synthesis of ZIF8 was performed in the presence of the probes in controlled molar ratios.<sup>2</sup> The effective inclusion of the probe within the micropores of ZIF8 was ascertained by TGA, XRD and luminescence.

### Results and Discussion

Modifications of the luminescence parameters of the probes were observed for the two probes. The modification of the spectra (maximum location, vibronic structure and anisotropy) clearly indicates the existence of confinement effects undergone by the adsorbed probes. The properties of adsorbed anthracene are different to that of pure crystalline anthracene, as evidenced by XRD and will be discussed in terms of luminescence.

### Bibliography

<sup>1</sup> MX Wu, YW Yang, Metal–Organic Framework (MOF)-Based Drug/Cargo Delivery and Cancer Therapy, *Advanced Materials*, 2017, 29, 1606134.

<sup>2</sup> Peralta, D., Chaplais, G., Simon-Masseron, A., Barthelet, K., Chizallet, C., Quoineaud, A.-A., Pirngruber, G.D., 2012. Comparison of the behavior of metal-organic frameworks and zeolites for hydrocarbon separations. *J. Am. Chem. Soc.* 134, 8115–26.