# SIX ORDERS OF MAGNITUDE ENHANCEMENT OF ELECTRICAL CONDUCTIVITY OF METAL-ORGANIC FRAMEWORKS DISPLAYING A SPIN CROSSOVER BEHAVIOUR

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Potential technological applications of bistable spin crossover complexes of transition metal ions have been increasingly considered in a large variety of fields such as thermometers, mechanical actuators, and so forth [1]. However, the scope for their integration into electronic devices still remains limited due to their insulating character. Here, we report an original strategy to increase the electrical conductivity of the SCO metal organic framework (MOF) $Fe^{II}$(pyrazine)[$Ni(CN)_4$]. The insertion of pyrrole molecules into the pores of the MOF from vapor phase followed by their *in-situ* polymerization into polypyrrole (PPy) [2] leads to an increase of the electrical conductivity of the pristine compound by ca. six orders of magnitude both in bulk powder and thin film samples. Importantly, the new MOF-PPy composites maintain their spin crossover properties, opening promising alternatives for the development of bistable conducting materials.

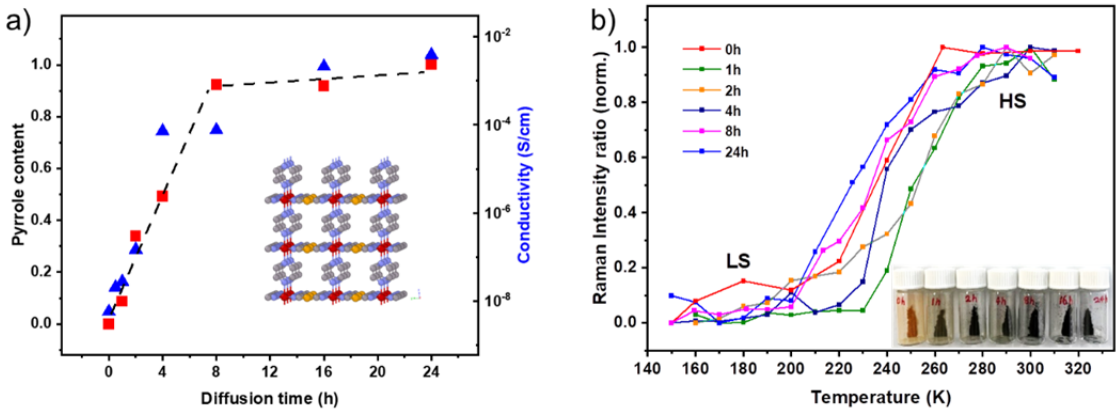


**Figure: a)** Evolution of the pyrrole content (from thermogravimetric analysis) and of the electrical conductivity (following in-situ pyrrole polymerization) as function of the pyrrole adsorption time in the compound $Fe^{II}$(pz)[$Ni(CN)_4$]. **b)** Temperature dependence of the Raman spectral intensity associated with the spin crossover properties of PPy- $Fe^{II}$(pz)[$Ni(CN)_4$] composites with different PPy content.

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