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Self-assembled monolayers of bis-tridentate SCO complexes

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Switchable materials are growing in interest for different applications such as sensors, memories, or spintronic devices. Among them, spin crossover (SCO) complexes are perfect candidates thanks to their response in front of a large variety of external stimuli *i.e.* temperature, pressure, light… Prior to integration of SCO complexes in such devices, they must be deposited on solid surfaces maintaining their switchability. Regarding this step, most of the previous research has been focused on ultrahigh vacuum deposition of thermally evaporable neutral SCO complexes onto metal surfaces. Herein we propose an alternative and simpler approach based on self-assembly onto surfaces of the complexes from solution.

To reach this goal, a family of tridentate ligands with bis(pyrazol-1-yl)pyridine core functionalized with a carboxylic acid group was obtained. These family has led to homoleptic and heteroleptic SCO Fe(II) compounds with interesting SCO properties in the bulk [1]. However, due to the lability of Fe(II), deposition of such molecules onto metal oxide surfaces by wet-chemistry protocols has been unsuccessful. To improve these results, we have prepared and characterized a family of SCO Co(II) complexes based on the prototypical terpyridine ligand containing carboxylic acid groups for grafting on noble metal and metal-oxide surfaces (see Figure for an example). Magnetic characterization of the bulk compounds has revealed interesting SCO properties such as reverse and abrupt SCO with thermal hysteresis of some of these compounds. On the other hand, preliminary X-ray Photoelectron Spectroscopy (XPS) and X-ray absorption spectroscopy (XAS) results of the deposited complexes suggest that they are stable on these surfaces and that the SCO properties are preserved.

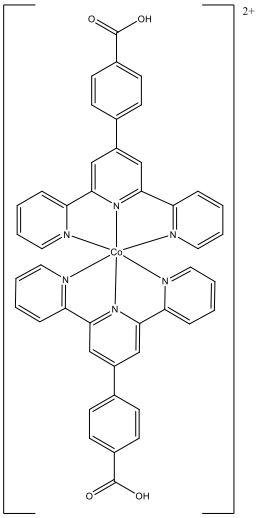

Figure: $[CoL_2]^{2+}$ (L = 4'-(4-carboxyphenyl)-2,2':6',2''-terpyridine)

References

[1] Víctor García-López, Mario Palacios-Corella, Salvador Cardona-Serra, Miguel Clemente-León and Eugenio Coronado *Chem. Commun*., (2019), 55, 12227
[2] Víctor García-López, Mario Palacios-Corella, Verónica Gironés-Pérez, Carlos Bartual-Murgui, José Antonio Real, Eric Pellegrin, Javier Herrero-Martín, Guillem Aromí, Miguel Clemente-León and Eugenio Coronado *Inorg. Chem*., **2019**, 58, 12199-12208