"ManCreationCAT: a visionary approach in catalysis"

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Mankind is able to design chemical processes that convert raw materials into desired products at high rates and yields. Unfortunately, these processes also come with major drawbacks, namely environmental pollution and by-products. Nature, on the other hand, has developed very precise catalytic processes via the evolution of enzymes, which are costly and fragile, and often have reaction rates too slow for industrial use.

The vision of Ma*N*CreationCAT is to combine the best from Mankind with the best from *N*ature and create novel, man-made catalysts that convert chemicals at high yields and turn-over rates, yet with high specificity and selectivity. Ultimately, this will allow the chemical building blocks of our society to be produced in a cleaner and more sustainable manner.

It has been shown that the synthesis of the molecular unit identified in an enzyme as the active centre is not sufficient for mimicking its performance. This "performance gap" has been attributed to the lack of a proper local environment required to obtain high activity combined with selectivity. More recently, thanks to the development of well defined highly porous materials it is possible to bind active metal complexes to the interior walls of microporous solid supports, or as an integrated part of a hybrid nanoporous structure. These approaches can locate the active site inside molecular sieves, creating catalysts with high selectivity in addition to the activity. The MaNCreation strategy relies on the possibility of synthesising porous materials with pre-designed active sites, including their environment. An increasing number of examples demonstrating the pre-synthetic design of MOFs have been appearing in literature, demonstrating that this is becoming possible. The synthesis of metal doped UiO-67 are recent examples.

- Braglia, L., *et al.*, Exploring structure and reactivity of Cu sites in functionalized UiO-67 MOFs, Catalysis Today , **283** (2016) 89-103.
- Braglia, L. *et al.*, Tuning Pt and Cu sites population inside functionalized UiO-67 MOF by controlling activation conditions, Faraday Discuss., **201** (2017) 277-298.