METAL-ORGANIC FRAMEWORKS FOR SUSTAINABILITY APPLICATIONS

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Metal-organic frameworks (MOFs) are interesting materials for sustainability as they offer multiple ways ofc converting, storing, and generating energy. While allowing for their integration in devices, such as fuel-cell membranes. I will present my group's latest results focussing on sustainable MOF synthesis and how to modulate the interaction strength between the metal-organic framework hosts and guest molecules/ions with potential applications in sustainability.

MOFs are porous crystalline inorganic-organic hybrid materials with tuneable chemistry and textural properties. [1] We have previously demonstrated that the interaction of small molecules [2], metal atoms [3] and metal nanoclusters [4] may result in altering the properties of the guests. This change consequently can be exploited to tune the properties of the guest for particular functions, such as applications for sustainability, of which a few examples will be given. MOFs with pore sizes near and below 1 nm (UiO-66, ZIF-8) have been synthesised and functionalised directly or post-synthetically by grafting various functional groups on the organic linker and/or embedding metal nanoclusters in their pores. The samples were screened for their interaction with reactants and electrolytes to uncover the relevant host-guest interactions and their impact on the materials' function.

I will be reviewing our latest results on MOFs' potential applications for sustainability as heterogenous catalysts for small-molecule conversion and solid-state ion conductors (*e.g.* Fig. 1).

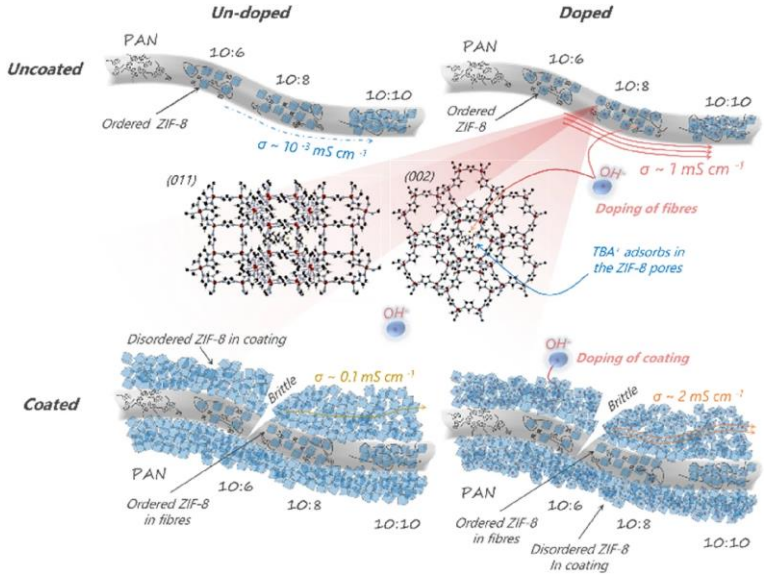

Fig. 1 Schematic representation of MOF-based self-supporting OH^--exchange fibre mats. [5]

References
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