ELECTRON HOPPING THROUGH METAL-ORGANIC FRAMEWORKS: FUNDAMENTAL INSIGHTS AND APPLICATIONS

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Owing to their large internal surface area, their porosity and synthetic tunability, metal-organic frameworks (MOFs) have become appealing research targets for a variety of applications, including energy storage, electrochromism, and catalysis. Amongst MOFs that are electrically conducting, those that propagate charge transport by a diffusional electron hopping mechanism are a rich research field, both from a fundamental as well as applied viewpoint.[1]

In this contribution, we will discuss a variety of MOFs that contain electronically isolated, redox active linkers, and determine factors that govern charge transport, in particular, the coupling between electron and cation transport.[2] We will show that electric conductivity through redox conducting MOFs is strongly dependent on the redox composition of the MOF, and can be tuned by up to four orders of magnitude.[3] Applications of redox conducting MOFs within molecular catalysis of electrochemical reactions[4] and as electrochromic materials[5] will be demonstrated.

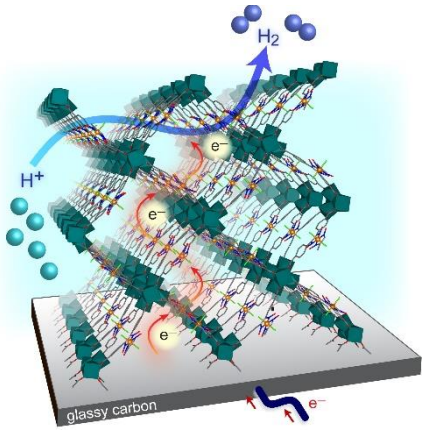

Figure. UU-100 MOF consisting of cobaloxime linkers for electrochemical HER

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