Facile synthesis of conductive metal-organic frameworks applicable for electrocatalysis

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Diverse functionalities of metal-organic frameworks (MOFs), a class of materials composed of metals and organic ligands, can be rationally designed through the synthesis with variable metals and organic ligands. The forming unique structures and chemical compositions are extensively explored in several applications including electrocatalysis [1-4]. Attributed by the porous structure and crystalline nature, MOFs can provide numerous and identical redox active metal nodes which are beneficial to be emerged as MOF electrocatalysts [4-6]. Superior electrocatalytic activities of MOFs are expected from the utilization of electrically conductive MOFs since the redox reaction and fast electronic transport can be facilitated [6]. This work focuses on the facile synthesis and application of electrically conductive cobalt-based MOFs as electrocatalysts for electrolysis of water as depicted in Fig. 1 [7,8]. Physicochemical and electrochemical characterizations of the obtained frameworks were conducted and discussed. Investigation on the superior electrocatalytic activities and proposed reaction pathway were also unveiled.

Figure 1. Co-based MOF with proposed catalytic site. Co1: orange, Co2: blue, Cl: green, N: grey, C: brown; H is omitted.