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Exploring Amine-based MOFs for Electrochemical Water Splitting

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Electrochemical water splitting is one of the widely studied routes to developing sustainable energy systems. Energy in the form of hydrogen has been gaining attention since it can be easily converted, stored, and transported. In order to improve efficiency, an electrocatalyst will be needed to aid the slow kinetics of the oxygen evolution reaction (OER) process. Metal-organic frameworks (MOFs) or porous coordination polymers (PCPs) are generally considered to have inferior electrocatalytic performance relative to noble metal oxides, however, in this study using a 2D Co-framework of 1,4,7-tris(4'-methylbiphenyl-4-carboxylic)-1,4,7-triazacyclononane deposited onto nickel foam has shown a promising catalytic activity. The fabricated electrode with a loading of 0.25 mg cm-2 has shown a low overpotential of 259 mV at the current density of 20 mA cm-2 in alkaline conditions. The electrochemical stability of the electrode was evaluated and showed continuous electrolysis with no decay for several hours at room temperature. These initial results not only provide a good design for fabricating MOF-based catalysts but also opens up more ideas for tuning and enhancing the electrochemical performance of amine-based MOFs.

Level of Expertise

Student

Presenter Gender

Woman

Pronouns

She/Her

Which facility did you use for your research

Australian Synchrotron

Students Only - Are you interested in AINSE student funding

Yes

Do you wish to take part in the Student Poster Slam

No

Condition of submission

Yes

Primary author(s) : ANG, Jade (Monash University)

Co-author(s) : Dr CHATTI, Manjunath (Monash University); Dr SIMONOV, Alexandr (Monash University); Dr TURNER, David (Monash University); Prof. BATTEN, Stuart (Monash University)

Presenter(s) : ANG, Jade (Monash University)

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