

Coupling CIGS Solar Cells with CoFe Bifunctional Catalysts for Direct Water Splitting

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Bifunctional CoFe hydroxide catalysts for water splitting have been synthesised by electrodeposition over molybdenum plates and nickel sheets, characterized and tested for water splitting in KOH 1M. The Mo electrode was destroyed during the oxygen evolution reaction by Mo oxidation while the reaction was performed successfully on Ni sheets. Thus, the synthesis parameters were optimized for the Ni substrate. Stable electrolysis has been demonstrated at about 1.8 V. To provide such a voltage with CIGS devices under illumination, at least three individual cells have to be connected in series. This can be achieved by using the monolithic interconnection scheme with three stripes in series. Finally, an experimental operational device has been constructed, with 5 interconnected cells with CoFe LDH-coated Ni sheets, able to perform solar water splitting with a STH efficiency of 7.38%.

Keywords : CIGS, Water splitting, Artificial Photosynthesis, catalysis

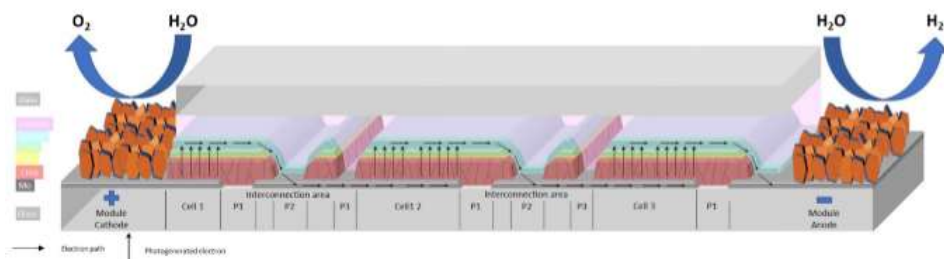


Figure 1 : Concept of CIGS-water splitting device

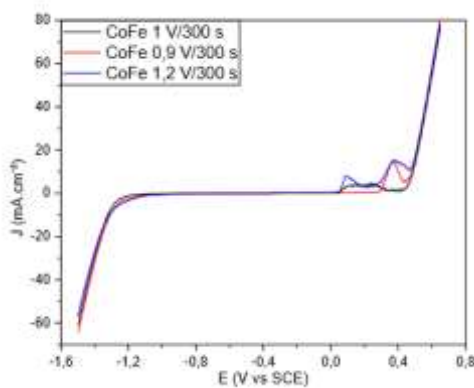


Figure 2 : Current voltage of FeCo catalyst in KOH

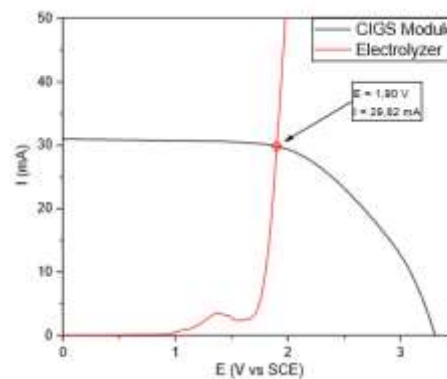


Figure 3 : Coupling a 5 cell monolithic CIGS module with FeCo electrodes in KOH

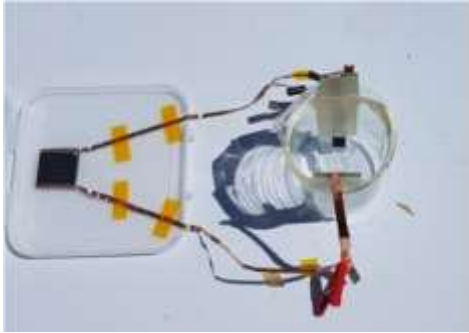


Figure 4 : Experimental device