

Enhancing the performance of a $\text{CuFeO}_2/\text{Cu}_2\text{O}$ composite system photocathode for solar hydrogen production

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PEC water splitting is one of ideal processes to produce H_2 with sunlight. There are various materials that can be used as photocatalyst for PEC water splitting like TiO_2 , WO_3 , and BiVO_4 . Among them, CuFeO_2 is a promising p-type semiconductor as a photocathode with many desired properties including the small band gap 1.55 eV to utilize solar spectrum effectively. Moreover, CuFeO_2 consists of earth abundant elements, so it has advantages for mass production.

Unfortunately, CuFeO_2 is insufficient material to be used alone because of its low activity and difficulties to synthesis. Here, the pure delafossite CuFeO_2 is synthesized through sol-gel method, and its activity has increased by making composite system with copper oxide.

Additionally, several post modification plans are introduced such as modifying delafossite thickness layer, adding protective layer to increase stability, and doping to improve conductivity.