Photoelectrochemical Water Oxidation Reaction for Coated and Meta-Chemical Surface Electrodes with $Na_3[Ru_2(\mu\text{-}CO_3)_4]$

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The most economical and efficient method to produce green hydrogen relies on electrochemistry, the electricity for which is of a green origin, and on photocatalytic water splitting. The latter technology involves the use of a photocatalyst or a photo-electrocatalyst to transform solar energy into chemical energy [1]. Vast efforts have thus been dedicated to the pursuit of such a catalyst [1–3].

The current study focused on developing a heterogeneous photoelectrochemical system using the $Na_3[Ru_2(\mu\text{-}CO_3)_4]$ complex as a WOC. To that end, two types of electrodes were prepared: coated indium tin oxide (ITO) and meta-chemical surface (MCS) electrodes. Under 420 nm illumination, both electrode types exhibited higher catalytic currents than were observed without light.

Our novel application of the $Na_3[Ru_2(\mu\text{-}CO_3)_4]$ complex as a catalyst in the photoelectrochemical water oxidation reaction requires minute amounts of the complex. The study findings add to the knowledge about the water-splitting process, and ultimately, they may facilitate the broader adoption of hydrogen as an environmentally friendly and increasingly accessible energy source.

References

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