

Electrodeposition of carbon cloth supported Co-Mo-B bifunctional catalytic electrode for water splitting

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Water splitting has attracted increasing global interest due to its ability of produce high purity hydrogen, but lack of non-noble metals based bifunctional catalysts with highly active for both hydrogen evolution and oxygen evolution reaction (HER and OER) substantially hinders its applications in large-scale. In this work, we propose a facile approach to fabricate a self-supported Co-Mo-B/CC electrode, via electrodepositing amorphous Co-Mo-B spheres on the carbon cloth (CC) supports. The prepared Co-Mo-B/CC electrode possesses comparable catalytic activity for HER with a low overpotential of 84.5 mV at -10 mA cm⁻² (cathodic current density). Meanwhile, it displays high activity for OER with 92.6 mV at 10 mA cm⁻² (anodic current density). In addition, the two-electrode electrolysis system of Co-Mo-B/CC(-)//Co-Mo-B/CC(+) exhibits a quite low cell voltage of 1.694 V to drive $j_{\text{cell}} = 10 \text{ mA cm}^{-2}$ for overall water splitting and outstanding durability, which makes it a promising bifunctional electrocatalyst for both the HER and OER.

Keywords: Co-Mo-B, Carbon cloth, Water splitting, Hydrogen evolution reaction, Oxygen evolution reaction

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