Contribution ID: **37** Type: **Poster**

Vertically Aligned β-NiOOH Nanosheet as Highly Active and Stable Catalytic Sites for Oxygen Evolution Reaction in Alkaline Media

Thursday, November 14, 2024 1:00 PM (1h 30m)

The long-term stability of Ni-based catalysts, employed in the anode of anion exchange membrane water electrolyzers (AEMWE), has been a persisting concern. In this work, through a simple and powerful electrochemical anodization process, vertically aligned β-NiOOH atomic sheets (vertical-β-NiOOH) grown on Fe-doped Ni nanoplates (FeNi nanoplates) as a solution are offered. The HRTEM and in-situ XAFS results revealed well-created vertical-β-NiOOH on the surface of FeNi nanoplates with Ni^{4+} active phase. This innovative electrocatalyst demonstrates sustained stability of constant current density for over 120 days during the oxygen evolution reaction. The zero-gap AEMWE cell harnessing the anodized FeNi nanoplates achieves a remarkable current density of 2.26 A cm^{-2} at 1.80 V with an energetic efficiency of 85.1%.

Paper submission Plan

Best Presentation

Yes

Contribution track

ICABU WG4. Applications of Particle Beams

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Session Classification: ICABU Poster Session

Track Classification: ICABU: ICABU WG4. Applications of Particle Beams