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A fascinating combination of Co, Ni and Al nanomaterial for oxygen evolution reaction

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Abstract

Interesting combination of Co, Ni and Al have been assessed for oxygen evolution reaction (OER). Layered double hydroxide (LDH) nanosheets of NiCoAl, Co-Al oxide nanoparticles and Co-Ni oxide nanoparticles were prepared and studied for the first time as OER catalyst. Among all the subjected catalysts, the binary LDH comprise of NiCoAl showed comparatively high catalytic activity than Co-Al oxide nanoparticles and Co-Ni oxide nanoparticles. The Co-Al and Co-Ni oxide nanoparticles showed current densities of 34.6 and 24.5 mA cm⁻², respectively at 1V in 0.3 M KOH solution. However at the same conditions, NiCoAl-LDH showed comparatively low overpotential, high current density (40.8 mA cm⁻²) and lower Tafel slope. The low overpotential and high catalytic activity of NiCoAl-LDH stipulate the possibility to reduce the demand of precious, rare earth and expensive transition metal catalyst in electrochemical water splitting for OER. (C) 2016 Elsevier B.V. All rights reserved.

Keywords

Author Keywords: Layer double hydroxide; Electrocatalyst; OER; Linear sweep voltammetry

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