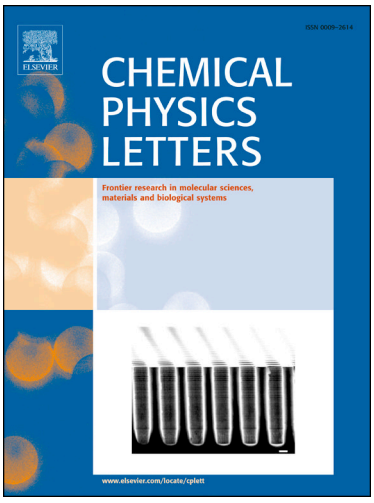

Research paper

Enhanced activity of CaFeMg layered double hydroxides-supported gold nanodendrites for the electrochemical evolution of oxygen and hydrogen in alkaline media

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Enhanced activity of CaFeMg layered double hydroxides-supported gold nanodendrites for the electrochemical evolution of oxygen and hydrogen in alkaline media

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Abstract

In this study, Au was electrodeposited on a support of CaFeMg layered double hydroxide and then, its catalytic activity was investigated for oxygen evolution reaction (OER) and hydrogen evolution reaction (HER). Field emission scanning electron microscopy images showed that a uniform porous film of aggregated nano-particles of the LDH has been decorated with Au nanodendrite-like structures (AuNDs@LDH). The results obtained from polarization curves, Tafel plots and electrochemical impedance spectroscopy showed that the AuNDs@LDH exhibits lower overpotential, higher current density, faster kinetics and enhanced stability for both of the OER and HER, in comparison with the single AuNPs and LDH catalysts.

Keywords: CaFeMg layered double hydroxide; Au nano-dendrites; Alkaline water electrolysis; Hydrogen evolution reaction; Oxygen evolution reaction; Bifunctional Electrocatalyst;

Introduction

The increasing demand of fossil fuel and the associated energy crisis due to limited resources and pollution problems have inspired people to look for alternative and renewable