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Short Communication

Synthesis of Mo doped Ni_2S_3 nanaorods arrays for overall water splitting

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The development of stable and active electrocatalyst for both hydrogen evolution reaction (HER) and oxygen evolution reaction (OER) is of significant importance toward overall water splitting related with the conversion of sustainable energy sources. Herein, we report the synthesis of molybdate-directed Ni_3S_2 heterogeneous nanorod arrays, in which the nanorods decorated with vertical nanosheets were densely and evenly covered on the surface of Ni foam. Benefiting from the abundant accessible active sites, accelerated charge transport, fast release of generated gas, and synergistic effect, the Mo doped Ni_3S_2 nanorod arrays exhibits excellent activity toward both OER and HER, delivering current density of 100 $mA.cm^{-2}$ at low overpotential of 350 mV for OER and 290 mV for HER, respectively. Moreover, such heterogeneous nanorods display a very low cell voltage of 1.83 V to approach 100 $mA.cm^{-2}$ along with a favorable robustness for 10 h in an alkaline electrolyzer. Different characterizations including XRD and SEM revealed the influence of Mo doping on the growth of heterogeneous nanorods. Electrochemical measurements confirmed the superior activity of Mo doped Ni_3S_2 originated from synergistic effect of Mo and Ni_3S_2. This work sheds light on the fabrication of versatile electrocatalysts for efficient energy conversion by demonstrating the novel design of heterogeneous nanorods as active catalysts.

Keywords: Ni_3S_2; Mo doping; nanorod; electrocatalyst; overall water splitting

FULL TEXT