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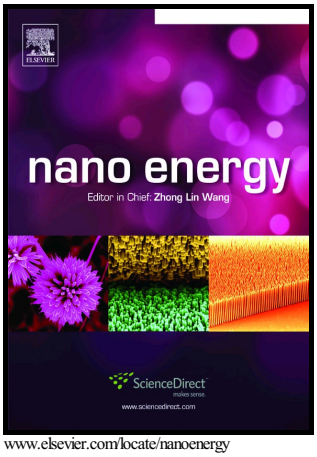

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Ruthenium-Nickel Sandwiched Nanoplates for Efficient Water Splitting Electrocatalysis

Jiabao Ding[1†], Qi Shao[1†], Yonggang Feng, Xiaoqing Huang[*]

College of Chemistry, Chemical Engineering and Materials Science, Soochow University, Jiangsu, 215123, China.

[*]To whom correspondence should be addressed. E-mail: hxq006@suda.edu.cn

Abstract

Since the interface in catalyst directly influences the catalytic performance, it is imperative to create hierarchical nanostructures with modulated atomic arrangements at the interfaces for catalysis optimization. Herein, we report an unprecedented ruthenium-nickel (Ru-Ni) heterostructure with phase-segregated sandwich-like morphology for boosting electrocatalysis. The Ru selectively grows at the two ends of the Ni pillar, in which intimate interfaces is formed between Ru and Ni domains. We found such Ru-Ni sandwiched nanoplates (SNs) are highly efficient for both hydrogen evolution reaction (HER) and oxygen evolution reaction (OER) in alkaline electrolytes with very low overpotentials and Tafel slopes. Significantly, the optimized Ru-Ni SNs deliver a low onset potential of only 1.45 V and enhanced durability in the overall water splitting device, indicating a promising electrocatalyst towards the practical alkaline electrolysis.

Graphical abstract

[1] Jiabao Ding and Qi Shao contributed equally