High-Entropy Oxide Supported in Graphene as Superior Electrocatalysts for Hydrogen Generation

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Abstract

Highly efficient hydrogen production with low energy consumption is a key factor for the sustainable development of hydrogen energy systems. Herein, we report a high-entropy oxide catalyst with a composition of Mn, Fe, Co, Ni, and Cu transition metals directly grown on nickel foam (HEO@NF) for advanced water electrolysis. The HEO@NF electrode with high oxygen evolution reaction (OER) activity and stability over 100 hours at high current densities is an efficient anodic catalyst together with hydrogen evolution at the cathode, which makes it possible to produce hydrogen at low cell voltages. When the HEO@NF catalyst is used in a complete electrolyzer cell configuration, the system can be used for hydrogen production at low cell voltages compared to traditional water electrolysis. This study demonstrates the potential of CO_2 laser-processed high-entropy oxide catalysts for efficient hydrogen production.

References

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