

Trimetallic FeCoMn-Borate Derived from Hierarchical Structured Metal-Organic Frameworks for Effective Oxygen Evolution Reaction

송은호, 이소연, 박정태[†]
건국대학교
(jtpark25@konkuk.ac.kr[†])

Metal-organic frameworks (MOF) have recently been attracted as promising pre-catalyst and catalysts to enhance the performance of the oxygen evolution reaction (OER). In this work, a ternary metallic FeCoMn-MOF was synthesized on nickel foam substrate as pre-catalyst and successfully converted to FeCoMn-borate through further in situ electrodeposition in potassium borate (K-B₃) solution. The trimetallic FeCoMn-borate electrode exhibit bouquet-like, 3D-sheet morphology and enhanced OER electrocatalytic activity based on the enlarged active site and improved wettability, which ensures improved rapid ion diffusion and charge transfer during the electrocatalysis. After electrodeposition, the electrocatalytic performance of the oxygen evolution reaction was improved compared to bare FeCoMn-MOF and the overpotential was reduced via the introduction of metal borate. The FeCoMn-B₃/FeCoMn-MOF heterostructures exhibited excellent OER electrocatalytic in a 1 M KOH alkaline media, attributed to 3-dimensional morphology with accessible active surface area and synergistic effect of ternary metal borate.