

Enhanced hydrogen evolution reaction using spinel typed $\text{CoMn}_2\text{O}_4/\text{C}$ catalysts as cathodic electrode

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Hydrogen energy, which is attracting attention as the next-generation clean energy source, is an environmentally friendly energy source that can replace the existing fossil fuel-based energy sources. The electrolysis of water is an environmentally friendly way to produce hydrogen without using fossil fuels. Platinum catalysts have been reported to have the best performance of HER. However, since platinum is too expensive to be commercialized, it is essential to develop a low cost, high efficiency / high stability electrode catalyst. In this study, bimetallic metal oxides were synthesized from Co and Mn, which are relatively inexpensive transition metals, and used as HER electrode catalysts. The synergistic effect of Co and Mn on the spinel structure showed not only high redox properties but also stable activity against HER. In addition, a small amount of carbon-based material was added to increase the catalytic activity in order to improve the stability and conductivity of the metal oxide. The physicochemical properties of catalyst were analyzed by XRD, SEM and HR-TEM, and the electrode performance was evaluated using LSV, CV and Tafel plots.