

## Spray Pyrolysis-Derived Hollow CoFe-NC/CNT Electrocatalyst with Improved Stability and Activity for Oxygen Reduction Reaction

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Exploring efficient and economical Pt-free electrocatalysts is of great significance for the electrocatalytic oxygen reduction reaction (ORR). Especially, the hollow and porous structure is desirable to enhance catalytic activity because of large surface area, rich active sites, shortened mass/charge transfer lengths, and surface permeability. Also, carbon-based materials have been used to effectively improve the conductivity and stability of the catalysts. However, the synthesis of carbon-based metal electrocatalyst with homogeneous distribution of active sites and well-controlled structure remains a challenging task. In this study, we designed and synthesized CoFe-NC/CNT electrocatalysts with improved stability and high catalytic activity for ORR by combining spray pyrolysis, MOF conversion, and carbonization. Spray pyrolysis has advantages of preparing hollow spheres with well-dispersed components, which is an ideal structure for mass transport. The synthesized hollow CoFe-NC/CNT catalysts were analyzed by BET, XRD, FE-SEM and electrochemical analysis system.