

Synthesis of Hollow Pt@Co-NC Electrocatalysts with Various Particle Sizes

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Nanomaterials are now receiving a lot of attention due to their excellent properties and various applications. Among them, metal-organic frameworks (MOFs) have been used in various applications such as gas separation, storage, and catalysis. However, MOF-based electrocatalyst still showed low catalytic activity and stability compared to commercial noble metal catalyst. To solve this problem, a small amount of precious metal has been added to the MOF to maximize the performance of the MOF-based electrocatalyst. In this study, we synthesized various sizes of Pt@Co-NC catalysts (50, 200, 500 nm). Different solvents affected nucleation and crystal growth rates during MOF synthesis, which resulted in various sizes of ZIF-67 crystals, and we used them as sacrificial templates to load platinum and grow ZIF-8 on the surface. As ZIF-8 grew on the surface, the excavation of ZIF-67 by heat treatment made the particles hollow and PtCo alloys were located inside of particles. Through the carbonization step, hollow Pt@Co-NC catalysts were synthesized in the end. The synthesized Pt@Co-NC catalysts were analyzed by XRD, FE-SEM, and BET.