

Facile Synthesis of Nitrilotriacetic Acid Derived Molybdenum Carbide/N-doped Carbon-CNT (Mo₂C/NC-CNT) for Efficient Hydrogen Evolution Reaction in Acid Media

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Molybdenum carbide (Mo₂C) catalysts are considered as a potential HER (hydrogen evolution reaction) catalyst due to their similar d-band electron structure to Pt. Recently, to improve the activity of Mo₂C electrocatalysts for HER, conductive N-doped carbon matrix has been employed as a support material for Mo₂C electro-catalyst. In this study, Mo₂C/NC-CNT (N-doped Carbon-CNT) catalyst has been prepared by simple thermal treatment method with the mixture of MoCl₅ and nitrilotriacetic acid (NTA). During the synthesis, NTA is used to chelate the metal ions as well as to provide nitrogen and carbon sources for nitrogen doping, carbide formation, and carbon matrix generation. The synthesized Mo₂C/NC-CNT electro-catalysts are studied in terms of materials characterization (SEM, TEM, XRD, XPS) and electro-chemical performance. The Mo₂C/NC-CNT showed high HER activity with small overpotential, which may be originated from N-doped carbon matrix that serves to provide high electronic conductivity and large surface area by well dispersed the Mo₂C particles.