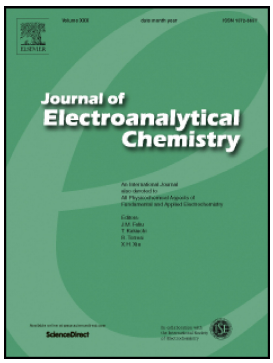

Copper-1, 3, 5-benzenetricarboxylate framework nanocrystals on polyaniline: Fabrication, characteristics, and electrochemical application for oxygen reduction reaction

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Copper-1, 3, 5-benzenetricarboxylate framework nanocrystals on polyaniline: fabrication, characteristics, and electrochemical application for oxygen reduction reaction

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Abstract

In this work, we fabricated copper-1, 3, 5-benzenetricarboxylate framework nanocrystals on polyaniline (nano-Cu-BTCs/PANI) composites via a Layer-by-Layer (LbL) method. By increasing the number of LbL cycles, size and amount of the nano-Cu-BTCs in the composites were increased. The composite with more amounts of nano-Cu-BTCs exhibited larger surface areas and more increased electrical resistivity. The composites were investigated as electrocatalysts for oxygen reduction reaction (ORR) in 0.1 M KOH. Among the nano-Cu-BTCs(*x* wt%)/PANI (*x* = 8.2, 12, 20, and 37) composites, the composite with 12 wt% of Cu-BTC nanocrystals showed the best electrocatalytic activity for ORR, which would be mainly associated with destabilization of a OH_2^- intermediate, resulting in a further reduction reaction of the intermediate to OH^- in the alkaline solution.

1. Introduction

Development of economical electrocatalyst materials is a critical goal for commercial progress toward a fuel cell[1, 2]. Pt-based materials are considered to be typical electrocatalysts for the oxygen reduction reaction (ORR), which is the cathode