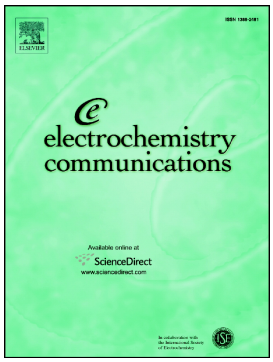

Selective electrochemical reduction of CO2 by a binder-free platinum/nitrogen-doped carbon nanofiber/copper foil catalyst with remarkable efficiency and reusability

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Selective electrochemical reduction of CO_2 by a binder-free platinum/nitrogen-doped carbon nanofiber/copper foil catalyst with remarkable efficiency and reusability

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Abstract:

In this report, Pt/NCNFs/Cu-foil, an efficient and stable catalyst, was prepared by the electrospinning method, which could be directly used for electrochemical reduction of CO_2. Formate with 93% Faradaic efficiency and about 46 mA cm^{-2} partial current density could be obtained at -0.6 V_{RHE}; alcohols with approximately 35% Faradaic efficiency and 14 mA cm^{-2} partial current density were achieved at -1.0 V_{RHE} using the same Pt/NCNFs/Cu-foil cathode. Moreover, Pt/NCNFs/Cu-foil could keep high efficiencies for at least 50 h durability tests.

Keywords:

CO_2 reduction; electrocatalysis; high catalyst productivity; excellent reusability; electrospinning technology

1. Introduction

In recent years, electro-catalytic CO_2 reduction reaction (CO_2RR) has become a cutting-edge research area [1-3]. However, challenges remain in CO_2RR, especially the difficulty in activating the relatively inert and stable CO_2 molecule. Therefore,