

研究亮点

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Facile electrolytic synthesis of Pt and carbon quantum dots coloaded multiwall carbon nanotube as highly efficient electrocatalyst for hydrogen evolution and ethanol oxidation

HeXiao^a ShoufengXue^a JingjuanZhang^a ManZhao^a  JianchunMa^a ShuaiChen^b ZhanfengZheng^b JianfengJia^a 
HaishunWu^a

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贾建峰教授团队在Chemical Engineering Journal 上发表最新研究成果, 肖何副教授为第一作者。
Facile electrolytic synthesis of Pt and carbon quantum dots coloaded multiwall carbon nanotube as highly efficient electrocatalyst for hydrogen evolution and ethanol oxidation

Abstract

Designing high-performance Pt-based catalysts with low catalysts cost is still a great challenge. Here, we demonstrate a facile electrolysis-solvothermal technique for making Pt and carbon quantum dots coloaded multiwall carbon nanotube (Pt-CQDs/MWCNT) catalyst with the assistant of electric field. Despite of the ultralow Pt amount (0.81 wt%) for the optimized Pt-CQDs/MWCNT catalyst, it exhibits ultrahigh electroactivity and durability toward hydrogen evolution reaction (HER) and ethanol oxidation reaction (EOR). The mass activities of the catalyst for HER and EOR can be achieved to 4889.7 mA/mg (-40 mV) and 4917 mA mg⁻¹_{Pt} (forward peak), which are 8.1 times and 5.6 times more active than those of commercial Pt/C respectively. The characterization results reveal that Pt nanoparticles (Pt NPs) with intrinsic structure play the key role in excellent catalytic performance for HER and EOR. CQDs not only support abundant anchoring points for fixation and dispersion of Pt NPs, but also construct 3D conductive network with MWCNT supporter for improving the catalytic performance.

全文链接: <https://www.sciencedirect.com/science/article/pii/S1385894720333969>

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