

材料化学工程与纳米技术

纳米活性炭/锌锰复合电极材料的制备及性能

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摘要

使用溶胶-凝胶法合成锌掺杂二氧化锰的纳米晶电极材料, 将其与干式振动滚压法制备的纳米活性炭混合制成超级电容器所需的片状电极。纳米活性炭材料为类球状颗粒, 粒径约为50 nm, 且为微孔和中孔并存的狭缝结构; 制备的锌掺杂二氧化锰纳米晶材料为中孔占优的孔隙结构, 含有纳米锌和氧化锌的成分, 经XRD测试和比表面分析, 得到此纳米晶材料的平均粒径小于30 nm。分析显示, 经滚压振动研磨改性的纳米活性炭与10%纳米晶锌锰材料混合的电极材料具有较好的电容性能, 比电容达到299 F·g⁻¹。

关键词

[纳米活性炭](#) [滚压振动研磨](#) [纳米晶锌锰电极材料](#) [溶胶-凝胶法](#)

分类号

Preparation and properties of activated carbon nano-particles/Zn-MnO_x composite electrode material

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Abstract

The composite electrode material using nano-Zn-doped MnO_x synthesized by the sol-gel method and activated carbon(AC) nano-particles obtained by roller vibration milling at room temperature was prepared. The microstructure and the electrochemical performance of the composite electrode material were studied with the AFM, XRD and electrochemical methods. The activated carbon nano-material showed spherical shape with 50 nm mean size and slit structure involving micro-pores and meso-pores. XRD and pre-surface analysis showed average pore size of the Zn-doped MnO_x nano-material was less 30 nm and mesopore dominates over porous structure. Meanwhile the AC nano-particles combined with 10% (mass) Zn-MnO_x material possessed improved electrochemical property with specific capacitance up to 299 F·g⁻¹.

Key words

[activated carbon nano-particles](#) [roller vibration milling](#) [Zn-doped MnO_x nanomaterial](#) [sol-gel method](#)

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扩展功能

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