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材料化学工程与纳米技术

介孔TiO_2晶须及其担载RuO_2的电容性能

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摘要

烧结法制备的介孔TiO_2晶须具有高结晶度，孔径可控，并且制备成本低，可以大规模生产。如能将该材料用于电化学电容器电极材料，则可以降低成本、提高电容器性能。采用孔径分布在10 nm左右的介孔TiO_2晶须及其担载氧化钌的材料制备了电极，循环伏安法分析表明该材料在中性的0.1 mol·L^{-1} 的Na_2SO_4溶液中即具有典型的电容行为，并且在较宽的扫描范围表现出一定的电容特性;介孔TiO2晶须担载RuO_2后，其电容性能优异，比电容达到940.4 F·g -1 （以RuO_2质量计），有可能作为电化学电容器的低成本大规模生产的电极材料。

关键词

介孔TiO2晶须 RuO2 电容性能

分类号

Capacitance performance of mesoporous TiO_2 whisker and composite loaded with RuO_2

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Abstract

Mesoporous TiO_2 whisker prepared by sintering has high crystallinity, its pore size is controllable, and the cost is low, so it can be mass-produced.If the material is used in electrochemical capacitorelectrode, the cost of the capacitor will be cut down.In this paper, mesoporous TiO2 whisker with pore size around 10 nm and TiO2/RuO2 composite material were prepared to make electrodes.The results of cyclic voltammograms showed that the material had typical electrochemical capacitor property even in the neutral solution of 0.1 mol·L^{-1} Na2SO4.The capacitor property was within a wide scan range.When the mesoporous TiO_2 whisker was loaded with RuO_2, the performance was excellent, and its capacitance was up to 940.4 F·g^{-1} (divided by the mass of RuO_2), so it is feasible to use this material as mass-produced electrode material.

Key words

mesoporous TiO_2 whisker RuO_2 electro-capacitor performance

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