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聚吡咯/氧化石墨复合材料的电化学电容性能

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Electrochemical Capacitive Property of Polypyrrole/Graphene Oxide Composites

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摘要 以改进的Hummer法制备氧化石墨（GO），用原位聚合法合成聚吡咯/氧化石墨（Ppy/GO）复合物，运用CV和CP法测试电化学性能，并以XRD，FTIR，SEM分析材料的结构形貌.结果表明：（1）Ppy/GO复合物具有较好的电化学电容性能.当电流密度为0.5 A·g^{-1}时，复合物在1 mol·L^{-1} H_2SO_4溶液中的比电容可达358.93 F·g^{-1}.（2）Ppy/GO复合物较Ppy有更好的循环稳定性和倍率充放电性能.当扫描速率分别为10，20，50 mV·s^{-1}时，复合物电极的循环伏安曲线均呈现出良好的矩形特征，并能保持一致性，而在相同扫描速率下，Ppy的循环伏安曲线不稳定；当电流密度分别为1，2，5 A·g^{-1}时，复合物的比电容分别达204.71，130.82，60.21 F·g^{-1}，高于相同条件下Ppy的178.05，123.89，46.52 F·g^{-1}.以上说明将聚吡咯与氧化石墨形成复合物有利于改善聚吡咯的电化学电容性能.

关键词： 聚吡咯 氧化石墨 复合材料 电化学电容

Abstract: The electrochemical capacitive property of Polypyrrole/Graphite Oxide(Ppy/GO) composites was studied.Firstly,graphite oxide was prepared by a improved Hummer's method,and the composites of Polypyrrole/Graphite Oxide was synthesized by in-situ chemical polymerizing method.Then using CV,CP method,the as-prepared composites' electrochemical capacitive property was measured,and using XRD,FTIR,SEM,its structure was characterized.The result shows that (1)the product presents a higher special capacitance,which is 358.93 F·g^{-1} at 0.5 A·g^{-1} in 1 mol·L^{-1} H_2SO_4 solution;(2)the cyclic stability and rate charge-discharge property of the composites is better than those of Ppy,when the scanning rate is 10，20，50 mV·s-1,the cyclic voltammograms of composites can keep consistently a good rectangle shape,and at a series of current density of 1,2,5 A·g^{-1},the corresponding special capacitance of the composite is 204.71，130.82，60.21 F·g^{-1},respective,which is higher than polyrrole's 178.05，123.89，46.52 F·g^{-1} under the same series of current density.The result indicates that it can effectively improve polypyrrole's rate property by in situ chemically polymerizing polypyrrole and graphite oxide to form Ppy/GO composite.

Key words: polyprrole；graphite oxide composite materials electrochemical capacitance

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