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石墨化中间相炭微球表面镀银的电化学性能

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摘 要: 采用化学镀的方法在中间相炭微球的表面镀覆金属银, 通过扫描电镜分析镀银后炭微球的表面形貌, 利用X射线衍射对试样进行物相分析. 将镀银的中间相炭微球用作锂离子电池负极材料, 测试其电化学性能. 研究表明: 金属银镀覆在中间相炭微球的表面, 随着镀银含量的增加, 镀银中间相炭微球的首次放电容量升高, 银含量16.5%的中间相炭微球的首次放电容量升高12.6 mA·h/g; 在湿度为25%的气氛中搁置12 h后, 未镀银的炭微球的放电容量降低16.3 mA·h/g, 循环稳定性变弱, 20次循环后容量保持率为74.6%, 而镀银量为16.5%炭微球的首次放电容量只降低6.1 mA·h/g, 并且循环稳定性强, 20次循环后容量保持率为95.8%, 说明镀银后中间相炭微球在潮湿条件下的电化学性能得到改善.

关键字: 中间相炭微球; 化学镀银; 放电容量; 锂离子电池; 循环性能

Electrochemical performance of Ag-coated mesocarbon microbeads

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Abstract: Silver was coated on the surface of graphitized mesocarbon microbeads (MCMBs) by electroless plating. The Ag-coated MCMBs were observed by SEM and analyzed by XRD, the electrochemical performance of Ag-coated MCMBs used as active anode material for lithium ion batteries is studied. It is found that Ag was plated on the surface of graphitized MCMBs successfully; the discharge capacity of Ag-coated MCMBs is increased with the enhancement of Ag. The discharge capacity of 16.5% (mass fraction) Ag-coated MCMBs is 12.6 mA·h/g higher than that of uncoated MCMBs in the first charge-discharge cycle. After being held at 25% humidity atmosphere for 12 h, the discharge capacity of MCMBs is decreased 16.3 mA·h/g and have worse cyclability holding 74.6% discharge capacity of that in the first cycle after 20 cycles. For the Ag-coated MCMBs, its discharge capacity was decreased 6.1 mA·h/g, and it has good cyclability holding 95.8% discharge capacity in the first cycle after 20 cycles. The electrochemical performance of MCMBs in humidity atmosphere is significantly improved by Ag-coated on the surface MCMBs.

Key words: mesocarbon microbeads; electroless plating silver; discharge capacity; lithium ion battery; cycling ability

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