

沥青包覆天然石墨的改性研究

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摘要: 以沥青作为表面修饰剂对天然石墨进行包覆, 并经过高温炭化热处理形成炭包覆天然石墨的复合材料。分别采用 X 射线衍射仪 (XRD)、扫描电子显微镜 (SEM) 和蓝电电池测试系统等对沥青包覆天然石墨前后的样品进行结构、形貌和电化学性能分析。XRD 分析结果表明, 经沥青包覆热处理后, 样品的 d_{002} 、 L_a 和 L_c 均随包覆量的增加而变大, 且有序化程度降低, 表明沥青成功包覆在了天然石墨表面; SEM 图片显示天然石墨表面包覆了一层无定形炭; 电化学性能测试结果表明, 采用沥青包覆改性后的天然石墨在 0.1C 首次脱锂容量高达 506.4mAh/g, 在 0.2C 下 25 次循环后脱锂容量为 413.4mAh/g, 而未经处理的天然石墨脱锂容量仅为 277.8mAh/g (0.2C 下 25 次循环后), 包覆后有利于比容量的提高。

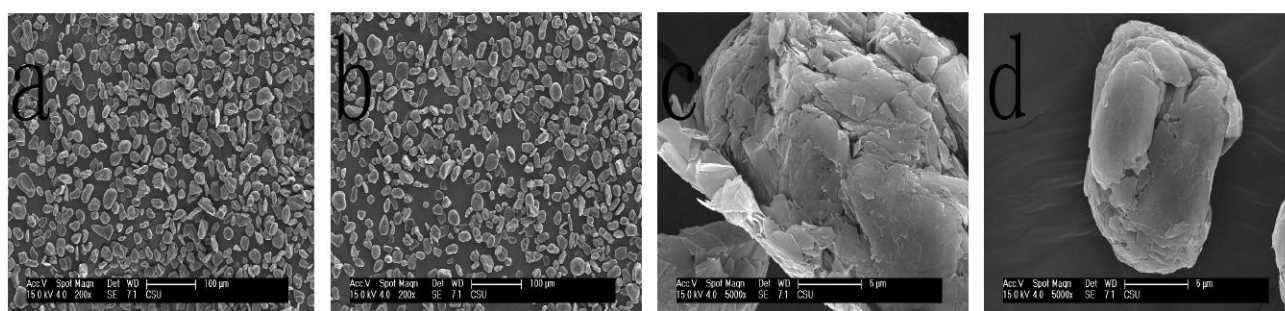


Fig1. SEM images of graphite before and after carbon coating process: (a)(c)original NG; (b)(d)carbon coated NG

关键词: 锂离子电池; 负极材料; 天然石墨; 沥青包覆

参考文献:

- [1]Gumjae Park.; Nanda Gunawardhana.; Hiroyoshi Nakamura.; YunSung Lee.;Masaki Yoshio.J Power Sources **2011,196(22)**: 9820.
[2]]F.Nobili.;M.Mancini.;P.E.Stallworth.;F.Croce.;S.G.Greenbaum.;R.Marassi.J Power Sources **2012,198**:243.

Research for modification of Asphalt-coated natural graphite

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Abstract: Carbon-coated natural graphite composite was prepared by carbonization of asphalt-coated natural graphite at high temperature. X-ray diffraction (XRD), Scanning electron microscopy (SEM) and Land battery test system were used to characterize the crystal structure, morphology and electrochemical properties of samples. XRD results showed that asphalt successfully coated on the surface of natural graphite because d_{002} , L_a and L_c increased with the increased of coated amount and the order degree decreased. SEM images indicated that the surface of natural graphite was coated with a layer of amorphous carbon. Electrochemical performance revealed that the initial lithium-deinsertion capacity of modified natural graphite was 506.4mAh/g at 0.1C and it remained 413.4mAh/g after 25 charge-discharge cycles at 0.2C while lithium-deinsertion capacity of untreated natural graphite was only 277.8mAh/g (after 25 cycles at 0.2C). Coating modification is benefit for improving the capacity of natural graphite.