Triclinic α -LiVOPO₄/C High-performance Cathode material synthesized via a ball-milling method

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Triclinic Lithium vanadyl phosphate (α -LiVOPO₄) as a cathode material for Lithium ion batteries was prepared via a route of mechanical ball-milling method. Using carbon material (acetylene black) as the carbon source, V₂O₅, NH₄H₂PO₄, CH₃COOLi and oxalic acid as raw materials to synthesis the α -LiVOPO₄/C. And the morphology of the sample was analyzed by TEM. The result of TEM shows that the surface of α -LiVOPO₄/C has a layer of carbon (3.6 nm), this is due to acetylene black formed a layer of carbon on the surface of α -LiVOPO₄ particles after thermal decomposition. Its existence effectively alleviated the agglomeration phenomenon of materials under high temperature calcination, increasing the conductive area of the material, reducing the polarization of the battery during charging and discharging process, and improved the electrochemical property of α -LiVOPO₄. In addition, the material could provide an initial capacity of 157.4 mAh g⁻¹ at 0.05 C (sintered at 600 °C). And it also could provide a discharge capacity of 155.6 mAh·g⁻¹ by the 50th cycle, the capacity retention rate was 98.8%.

Keywords: electrochemical properties; α -LiVOPO₄/C; acetylene black

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