

Title : Garlic peel derived porous carbon anode for lithium-ion batteries

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ABSTRACT

Lithium-ion batteries (LIBs) are used in various applications due to their high energy density, lightweight, and good charge-discharge efficiency. The commonly used anode material in LIBs is graphite. However, graphite has a low specific capacity of only 372 mAh/g, which still needs further development. One of the materials that has gained attention as an anode for LIBs is porous carbon. Its high specific surface area offers higher specific capacity and better electrochemical performance. Therefore, this research aims to synthesize porous carbon from agricultural waste garlic peels. Their thin physical characteristics could facilitate pore formation more easily. The porous carbon was prepared simply, rapidly, and at low cost using a microwave technique with potassium hydroxide as the pore activator. Physical characterization, including X-ray diffraction (XRD), scanning electron microscopy (SEM), and surface area analysis, showed that the material was amorphous carbon and the resulting pores were mostly mesopores which help increase the surface area up to 718.96 m²/g. The electrochemical performance tests showed that the material had a specific capacity up to 588.77 mAh/g at 100 mA/g after 150 cycles, which was higher than the theoretical capacity of graphite, making it suitable as an anode material for LIBs. This could be beneficial for the future production of anode materials for LIBs.