

## **Biomass-derived graphite as an anode material for high-performance Li-ion batteries at low temperature**

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Nowadays the demand for lithium-ion batteries with properties such as fast charging, high energy density and wide operating temperature range has attracted considerable attention. Graphite constitutes the first and most widely used anode in commercial LIBs owing to its remarkable cyclic stability, low potential vs. Li/Li<sup>+</sup> (0.1 V) and high initial Coulomb efficiency. On the other hand, its rate characteristics are usually poor, particularly at sub-zero temperatures. Furthermore, high current can promote lithium plating and dendrite growth on the graphite surface, resulting in poor battery performance and a potential safety risk.

In this study, we purpose alternative biomass-derived porous graphitic carbon from date seeds as anode material for a low-temperature lithium-ion battery. The as-obtained graphite was characterized by X-ray diffractometry, scanning electron microscope, Raman scattering and X-ray photoelectron spectroscopy. The honeycombed structure of graphite shortens the diffusion path and provides excellent anode properties, showing high specific capacity at low temperatures.

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