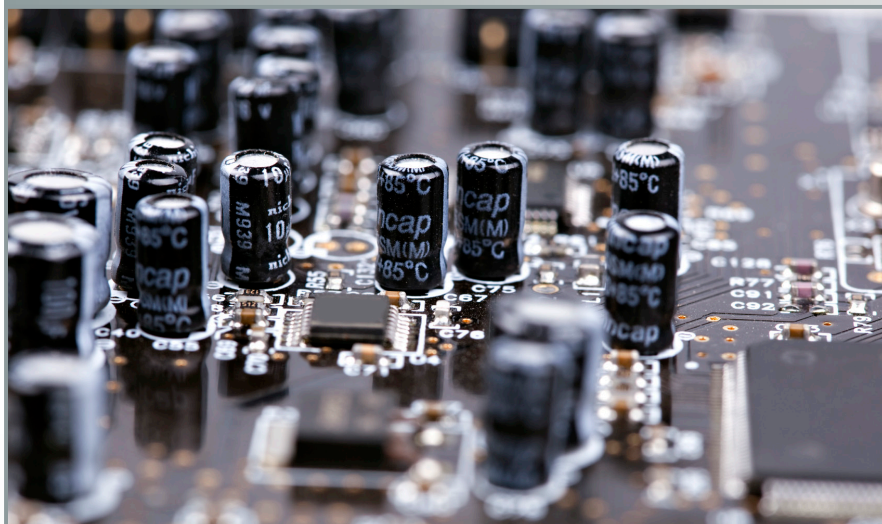


“Brick-and-Mortar” Self-Assembly Approach to Mesoporous Carbon Nanocomposites

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Technology Summary

Mesoporous carbon materials lack sufficient ordering at the atomic scale to exhibit good conductivity properties and thermal stability. To date, mesoporous carbons having uniform mesopores and high surface areas have been prepared from partially graphitizable precursors in the presence of templates. High-temperature thermal treatments above 2000 C, which are usually required to increase conductivity, result in a partial or total collapse of the mesoporous structures and reduced surface areas induced by growth of graphitic domains, limiting their applications in electric double-layer capacitors and in lithium-ion batteries.

In this work, we successfully implemented a “brick-and-mortar” approach to obtain ordered graphitic mesoporous carbon nanocomposites with tunable mesopore size below 850 C and without using graphitization catalysts or high-temperature thermal treatments. The capacitance and resistivity of the final materials can be tailored by changing the mortar-to-bricks ratios.

Advantages

- Provides a more economically viable and environmentally friendly method of preparing thermally stable, highly conductive nanocomposites
- Eliminates the need for high-temperature treatment methods or graphitization catalysts
- Able to tailor the capacitance and resistivity of the final product

Potential Applications

- Electric double-layer capacitors
- Lithium-ion batteries
- Portable electronic devices
- Hybrid vehicles

Patent

Application in preparation

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