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# Amorphous Si-island/Graphene Oxide-Carbon Hybrid Anode Thin Film for a Lithium-Ion Battery

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## Abstract

A multi-layered graphene oxide-carbon/Si-island thin film/graphene oxide-carbon electrode is prepared as a very promising anode material for rechargeable Li-ion batteries. In this approach, graphene oxide-carbon layers are introduced to improve the adhesion (between the Si-island and copper current collector) and conductivity. The Si-island (diameter: 700  $\mu\text{m}$ ; array distance: 480  $\mu\text{m}$ ) is sputtered using a metal shadow mask. The strain during the insertion and extraction of the Li ions is adequately suppressed by the space among the neighboring Si-islands. This results in a superior cycle retention of 86.3 % with a reversible discharge capacity of 940 mAh  $\text{g}^{-1}$  after 105 cycles.

*Keywords:* Lithium-ion battery; Anode; Silicon islands; Graphene oxide; Multi-layered

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