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Core-shell SiO@F-doped C composites with interspaces and voids as anodes for high-performance lithium-ion batteries

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Abstracts: Core-shell F-doped carbon coated SiO composites with interspaces and some small voids (SiO@F-doped C) are successfully fabricated using bulk SiO as starting material. With the assistance of polytetrafluoroethylene (PTFE), both etching and carbon coating of SiO are firstly performed in a single step, which largely lowers the production cost of materials. The SiO@F-doped C composite obtained by annealing the mixture of SiO and PTFE with a mass ratio of 5:3 at 650 °C shows the highest stable discharge capacity with excellent cycling stability. It delivers a stable discharge capacity of about 975 mAh g⁻¹ at a current density of 100 mA g⁻¹. Even after the current density increases to 1600 mA g⁻¹, a stable discharge capacity of about 553 mAh g⁻¹ can be achieved. At a current density of 400 mA g⁻¹, the composite maintains

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