

A simple dispersion of Si nanoparticles in inverse opal carbon structures for highly stable lithium-ion battery anodes

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The confinement and uniform dispersion of Si nanoparticles (NPs) in a carbon matrix is one of the promising strategies to alleviate large volume change of high-capacity Si-based anodes during charging/discharging in lithium-ion batteries. In this study, we introduce an inverse opal carbon (IOC) matrix for simple Si NPs dispersion. We study a dispersion of Si NPs in the macroporous, highly interconnected porous IOC matrix. The Raman and XRD analyses are used to characterize carbon and Si properties of the Si NPs/IOC composite anode. Finally, we compare the specific capacity of the bare Si NPs electrode and Si NPs/IOC composite electrode to show the IOC effect on lithium-ion battery performance.