Hollow anatase TiO_2 microcones for superior rate performance lithium-ion storages

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Lithium-ion storages have attracted significant attention for electric vehicles, electronic devices and so on. Recently, the negative electrode materials for lithium-ion storages have been widely studied regarding the increase in power density. Among them, TiO2 offers lots of advantages as anodes such as chemical stability, non-toxicity and negligible volume expansion. To increase the energy capacity, desired nanostructure of TiO2 has been used as negative electrodes because nanosizing titanium oxide can improve the lithium intercalation/ de-intercalation during cycling.
Herein, hollow anatase TiO2 microcones were prepared via anodization process under specific conditions. The as-preased TiO2 microcones were characterized by TEM, XRD and SEM with EDS mapping, showing that the TiO2 microcones exhibited a high active surface area with a hollow core and composed of pure anatase phase. The electrochemical measurements confirmed that the areal capacity of TiO2 microcones was higher than that of TiO2 nanotubes with the excellent cycling stability. The morphology of TiO2 microcones was maintained over long-term electrochemical cycle due to a hollow structure and low volume expansion.