

Hierarchically mesoporous anatase titanium oxide (TiO<sub>2</sub>) microspheres are synthesized using a green supercritical methanol

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Hierarchically mesoporous anatase titanium oxide (TiO<sub>2</sub>) microspheres are synthesized using a green supercritical methanol route at a very short reaction time of 15 min without using templates or surfactants. Primary nano-sized particles with diameters of 20–55 nm with organic coverage on the surface are loosely aggregated and form secondary micron-sized particles with diameters of 1.0–2.5 μm, endowing the a mesoporous structure with pore diameters of 2–50 nm. When the as-synthesized microspheres were calcined under a Ar/5% H<sub>2</sub> condition, carbonization of the organic groups form ultrathin and uniform carbon layer on the nano-sized primary particles with thickness of 0.5–1 nm and reduces some of surface Ti<sup>+4</sup> into Ti<sup>+3</sup>. Both the hierarchically mesoporous structure and the conductive layer coating have positive effects to increase Li ion storage capacity.