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# Synthesis and characterization of carbon supported V<sub>2</sub>O<sub>5</sub> nanotubes and their electrochemical properties

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**Abstract** Vanadium pentoxide (V<sub>2</sub>O<sub>5</sub>), as one of the most important electrode materials for lithium ions batteries, attracts tremendous attention. Here, carbon supported V<sub>2</sub>O<sub>5</sub> hollow nanotubes are synthesized using carbon fibers as templates through solvothermal reaction with subsequent annealing treatment. Morphological features of the samples are investigated by field-emission scanning electron microscopy (FESEM) and transmission electron microscopy (TEM). X-ray diffraction (XRD) patterns confirm the formation of phase-pure structure. Elemental mapping and XPS studies are used to confirm the existence of carbon and V<sup>4+</sup> in nanotubes. Electrochemical Li insertion behavior of nanotubes are explored as cathode in half cell configuration (vs. Li) using cyclic voltammetry, galvanostatic charge-discharge studies and rate tests. The V<sub>2</sub>O<sub>5</sub> hollow nanotubes display a good cycling performance with a specific capacity of 237 mA h g<sup>-1</sup> after 50 cycles at 100 mA g<sup>-1</sup> in the voltage range of 2.0-4.0 V. Moreover, the

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