Phase-dependent Performance of Lotus Root Type TiO2 for Lithium Ion Battery (LIB) by Heat Treatment

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We have recently reported a noteworthy performance of a lotus-root shaped TiO2 (in short, LR TiO2) for the anode material of lithium ion batteries (LIBs). The featuring lotus-root shape was built by using a cetyltrimethylammonium hydroxide (CTAOH) template, providing micro-channels for efficient lithium ion diffusion inside each LR TiO2 mesoporous particle. Meanwhile, the crystal phase (anatase, rutile, or brookite) of LR TiO2 particles can be controlled by thermal treatment with their lotus-root shape unchanged. Considering the phase transition between anatase and rutile occurs at around 550 ℃, we are preparing LR TiO2 samples thermally treated at three different temperatures, 700, 550, 450 ℃. Again, the macro-structure of lotus-root shape would not change, but their electrical performance will be affected by constituent crystal phase of LR TiO2. Thus, we are comparing three LR TiO2 samples, in terms of micro-porous structures (by scanning electron microscopy), crystal phase (by X-ray diffraction), and the resulting electrical performance using coin cell tests (by cyclic voltammetry and electron impedance spectroscopy).