Surface analysis and preparation of nano porous TiO_2 films fabricated by anodization

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TiO_2 nanotube thin films (TiO_2 NTs) were fabricated by anodic oxidation method in H_3PO_4/NaOH/HF electrolyte. X-ray powder differactometry (XRD) and Scanning electron microscopy (SEM/EDX) were used to investigate the structure. morphology, length and pore diameter of the obtained TiO_2 NTs. Secondary ion spectroscopy (SIMS) analysis was used to investigate the surface atom image and depth profile analysis of TiO_2 NTs. By optimizing the electrochemical anodization conditions, TiO_2 nanotubes with tunable structures can be reproducibly prepared. It is expected that this technique will be applied in the preparation of lubricating, polymer bonded and Li ion battery material.