

Supporting Information for:

Hierarchical Layered Titanate Microspherulite: Formation by Electrochemical Spark Discharge Spallation and Application in Aqueous Pollutant Treatment

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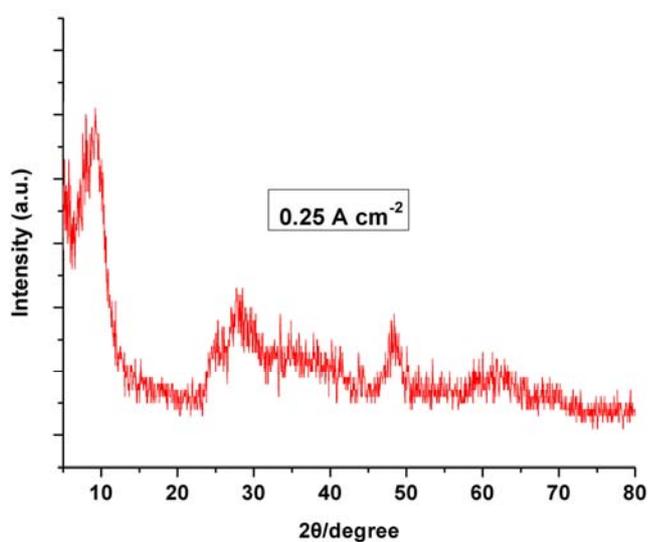


Fig. S1 The XRD pattern of the titanate materials obtained at under a initial current density of 0.25 Acm⁻².

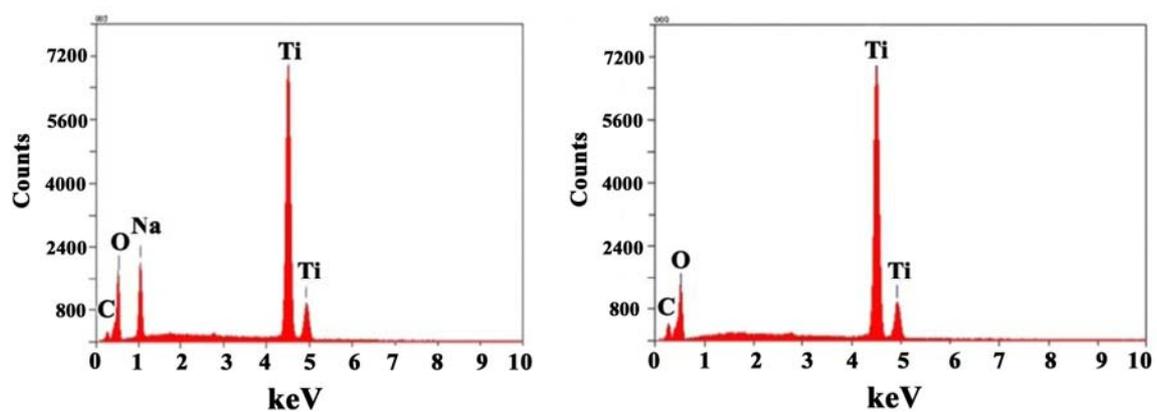


Fig. S2 FESEM-EDS data of as prepared powers of (a) NaH-TMS and (b) H-TMS.

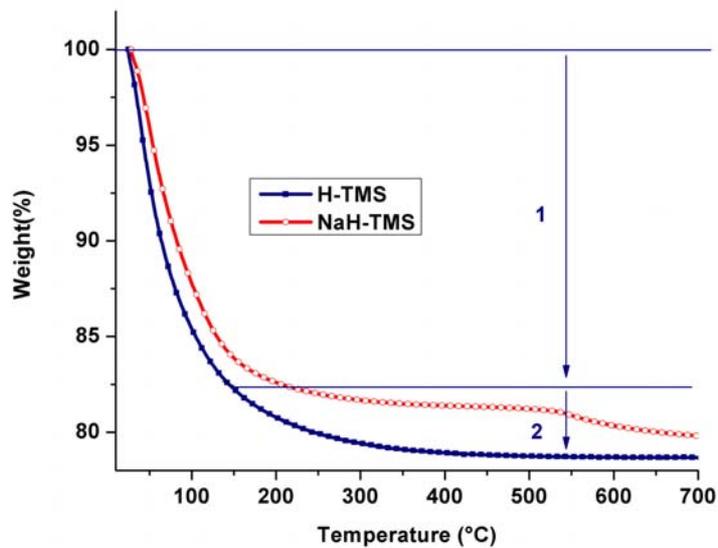


Fig. S3 The TGA curves of the as-prepared powders of NaH-TMS and H-TMS measured at a heating rate of $10\text{ }^{\circ}\text{Cmin}^{-1}$ under N_2 flow.

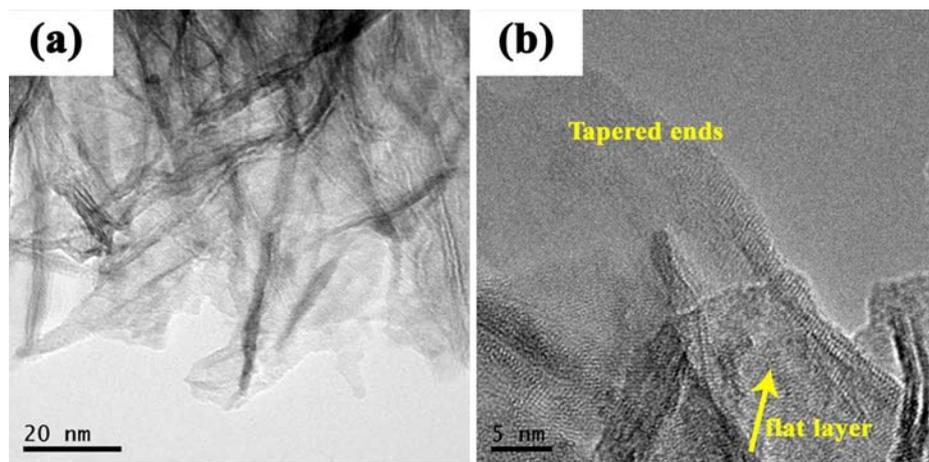


Fig. S4 The TEM (a) and HRTEM (b) images of the nano-flakes structure of the H-TMS.

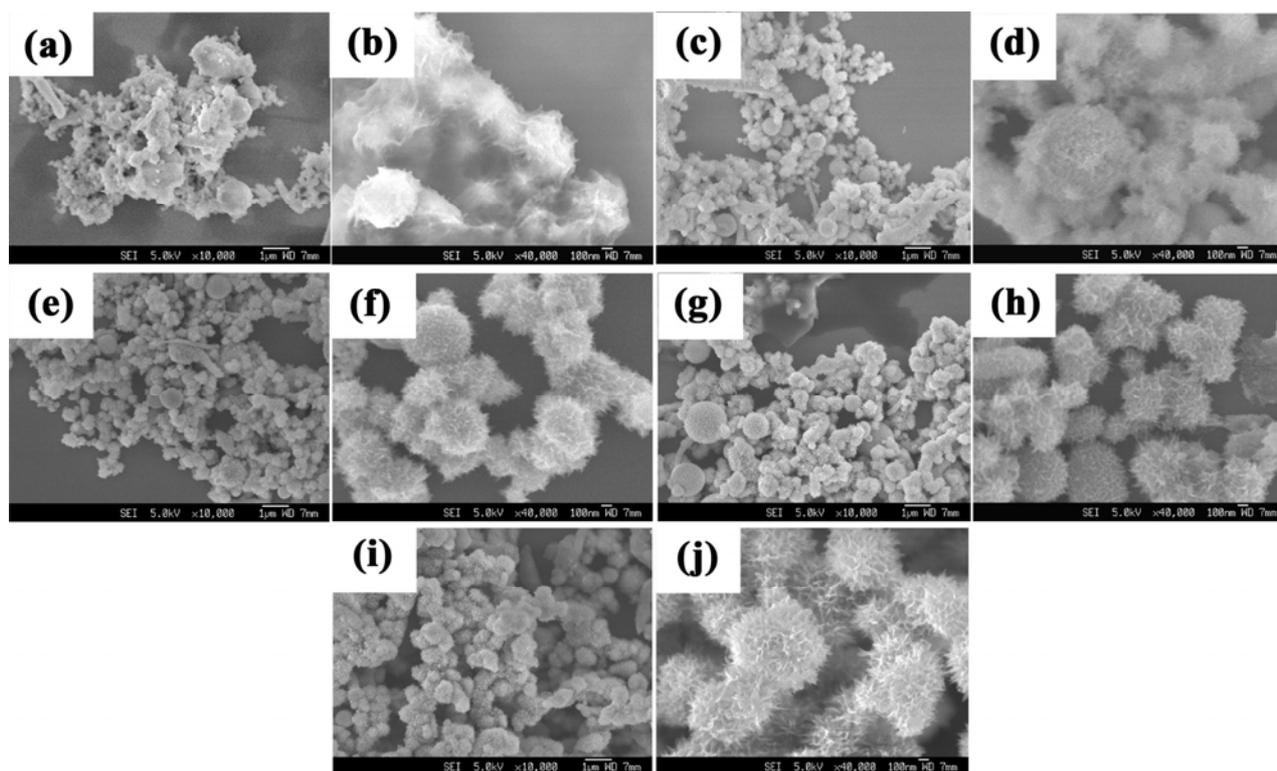


Fig. S5 The morphology evolution of the TMS with processing time. (a, b) 2 min; (c, d) 5 min; (e, f) 10 min; (g, h) 15 min; (i, j) 20 min. The second micrograph in each condition shows high magnification view of the same sample.

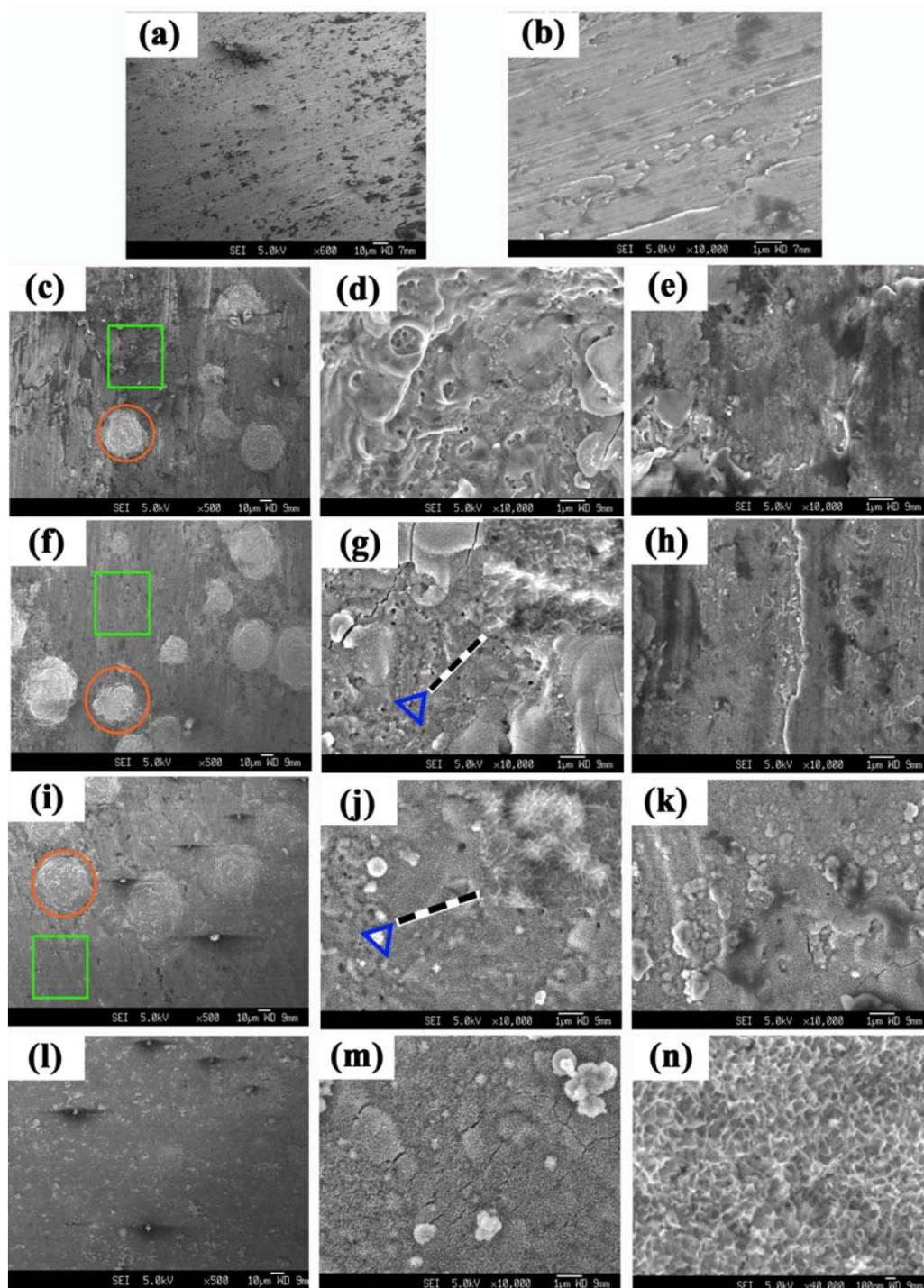


Fig. S6 The morphology change of the nanoporous TiO₂ on Ti foil (a, b) 0 min; (c, d, e) 2 min; (f, g, h) 5 min; (i, j, k) 10 min; (l, m, n) 20 min under a current density of 0.5 Acm⁻²; The images of (d, e), (g, h), (j, k) are the high magnification micrographs of the selected regions by circle and rectangle in (c), (f), (i) respectively; The inset images of (g) and (j) are the magnification of triangle in image (g) and (j) individually.

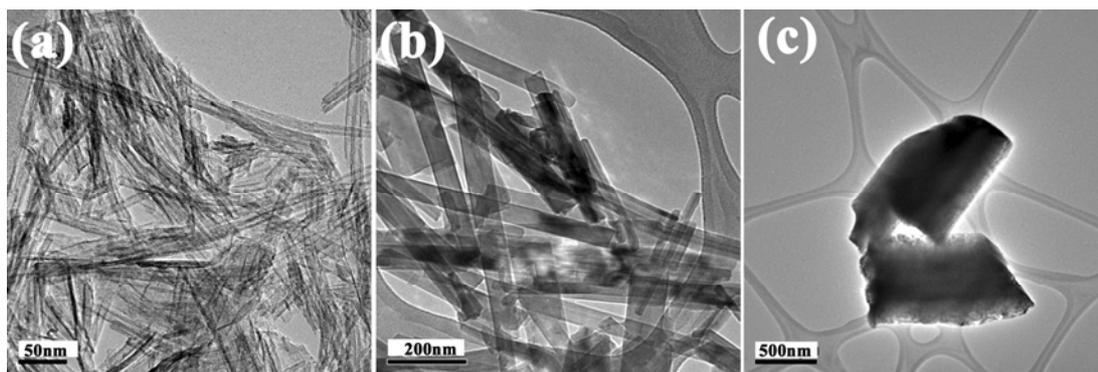


Fig. S7 The TEM images of the (a) titanate nanotube (TNT); (b) titanate nanowire (TNW) obtained by hydrothermal treatment of anatase TiO_2 powders in 10 M NaOH at 130 and 170 °C for 48 h respectively; (c) The $\text{Na}_2\text{Ti}_3\text{O}_7$ micro-particle (TMP) synthesized via a solid-state route with the mixture of commercial TiO_2 anatase and Na_2CO_3 at 900 °C for 24 h.

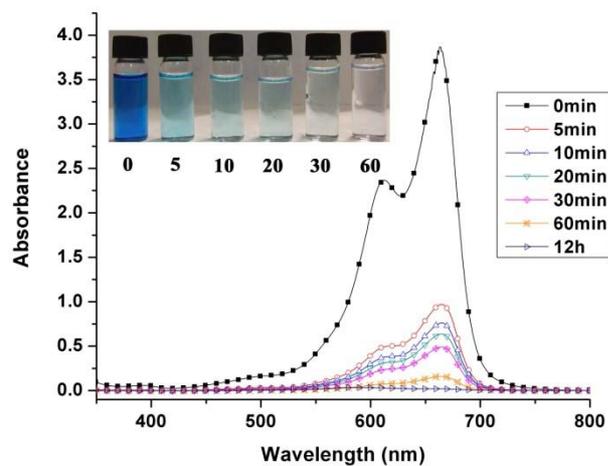


Fig. S8 Adsorption spectra of a solution of MB (20 ppm, 50 mL) in the presence of TMS (10 mg) after 0, 5, 10, 20, 30, 60 and 720 min. The inset images show the corresponding color change at these time intervals.

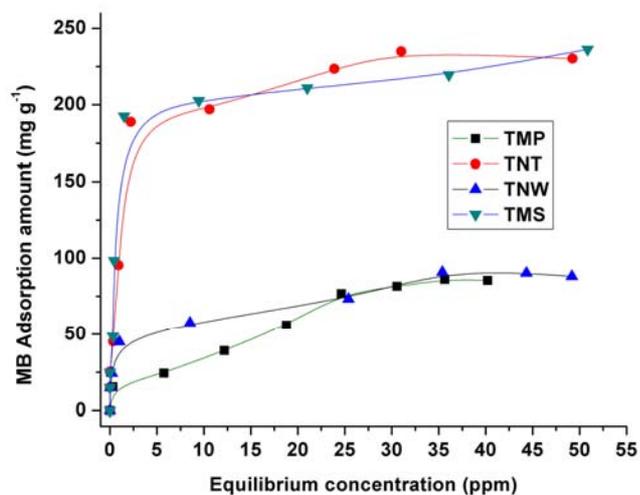


Fig. S9 Adsorption isotherms of MB dye by TMP, TNT, TNW and TMS particles. The experiment was carried out with 50 mL of MB solution with varying concentrations from 20 to 100 ppm for 72 h. In each run, 10 mg of adsorbent was added to the solution. The pH value of the solution was within the range of 9.5~10.

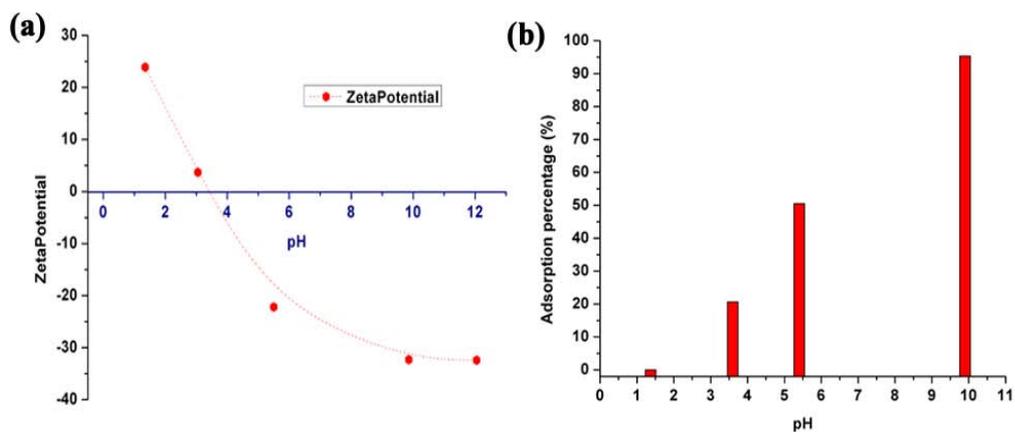


Fig. S10. (a) Zeta potential of the TNT sample in different pH solutions. The initial solution was prepared by dispersing the particles in 0.1 M NaCl solution. (The pH value is adjusted by dilute HCl and NaOH solution. b) Effect of solution pH on the adsorption MB on TNT ($C_0=20$ ppm) after 72 h.