Electronic Supplementary Information

A simple, facile and low-cost method for the preparation of mixed-phase titanium oxide: Toward efficient photoelectrochemical water oxidation

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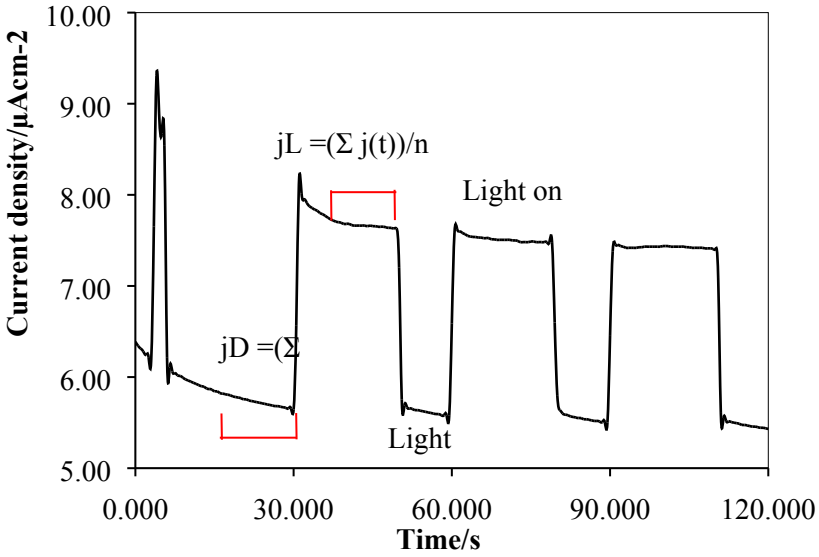

Figure S1. Example plots of photocurrent measurement experiment of pulsed light method in constant potential. The

calculation method used in order to obtain photocurrent is as follows:

$$j_{ph} = j_L - j_D = \Delta j$$

Where j_{ph} is photocurrent amount, j_L is current under illumination and j_D is current in dark.

Figure S2. Color of titanium oxide layers prepared through high voltage method in different bias potential on titanium electrodes

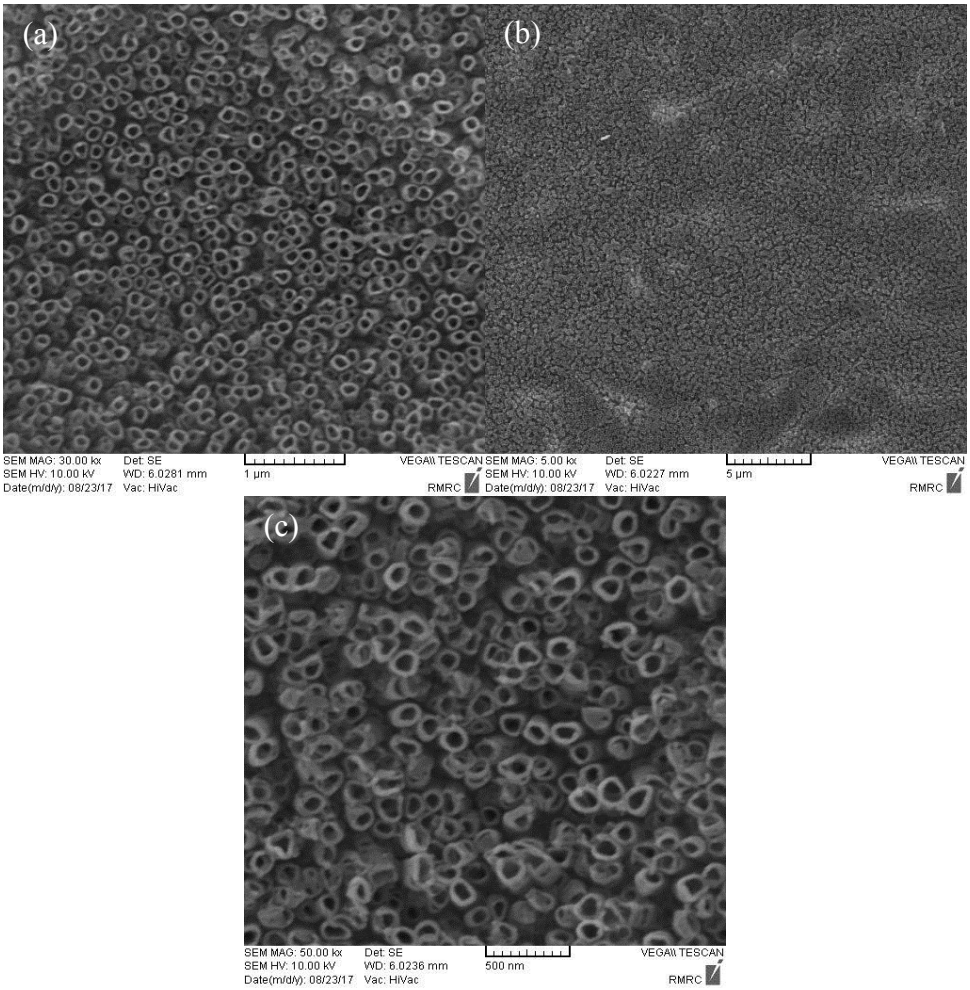

Figure S3. SEM images of Ti-nanotube (H_2SO_4/KF) electrode with (a) 5 kx, (b) 30 kx and (c) 50 kx magnifications. The electrode prepared in a sulfuric acid (1.0 M) and KF (0.10 M) electrolyte by anodization at 20 V bias potential versus platinum electrode for 30 minutes.

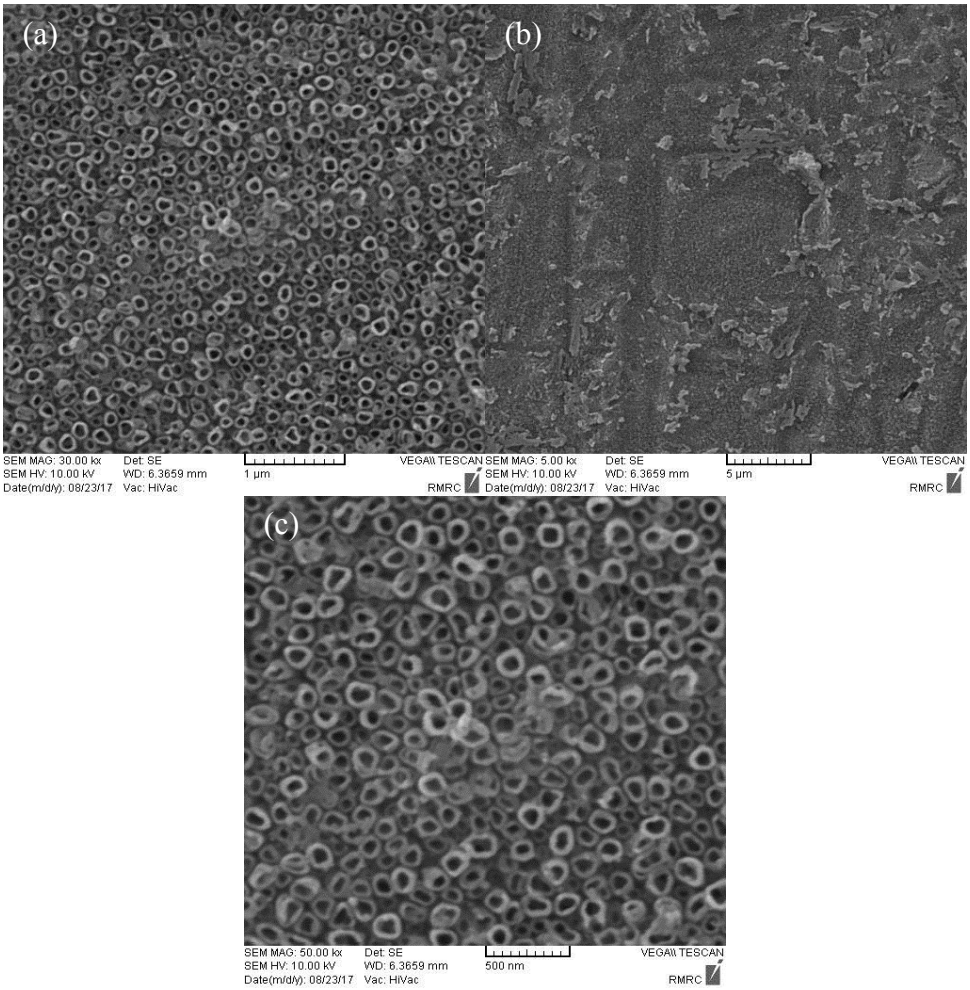

Figure S4. SEM images of Ti-nanotube (EG/KF/H_2O) electrode with (a) 5 kx, (b) 30 kx and (c) 50 kx magnifications. The electrode prepared in a 2.5 %wt water, 0.5 %wt KF and 97 %wt ethylene glycol electrolyte by anodization at 20 V bias potential versus platinum electrode for 180 minutes.

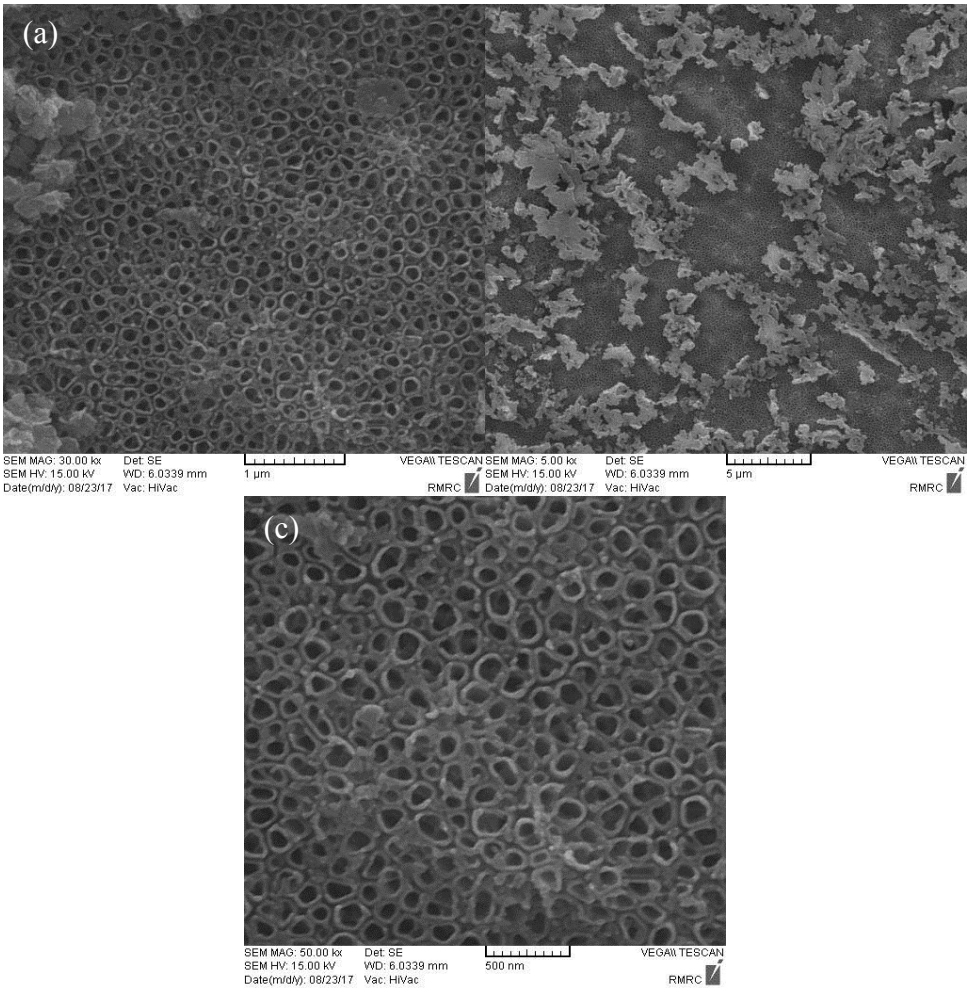

Figure S5. SEM images of Ti-nanotube (EG/NH_4F/H_2O) electrode with (a) 5 kx, (b) 30 kx and (c) 50 kx magnifications. The electrode prepared in a 2.5 %wt water, 0.5 %wt KF and 97 %wt ethylene glycol electrolyte by anodization at 20 V bias potential versus platinum electrode for 180 minutes.

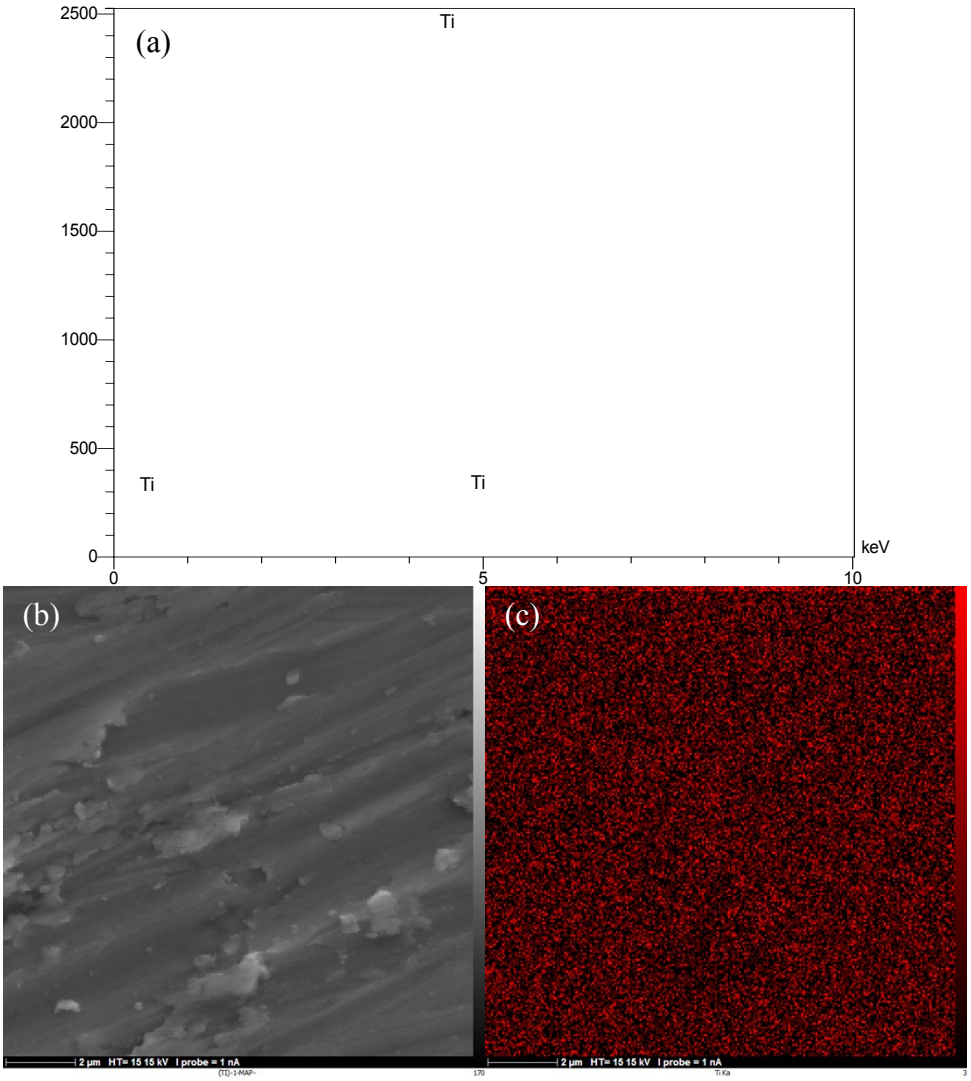

Figure S6. EDX spectra (a), selected area for measurement of EDX map (b) and titanium EDX map (c) of Ti electrode. The red color represents Titanium.

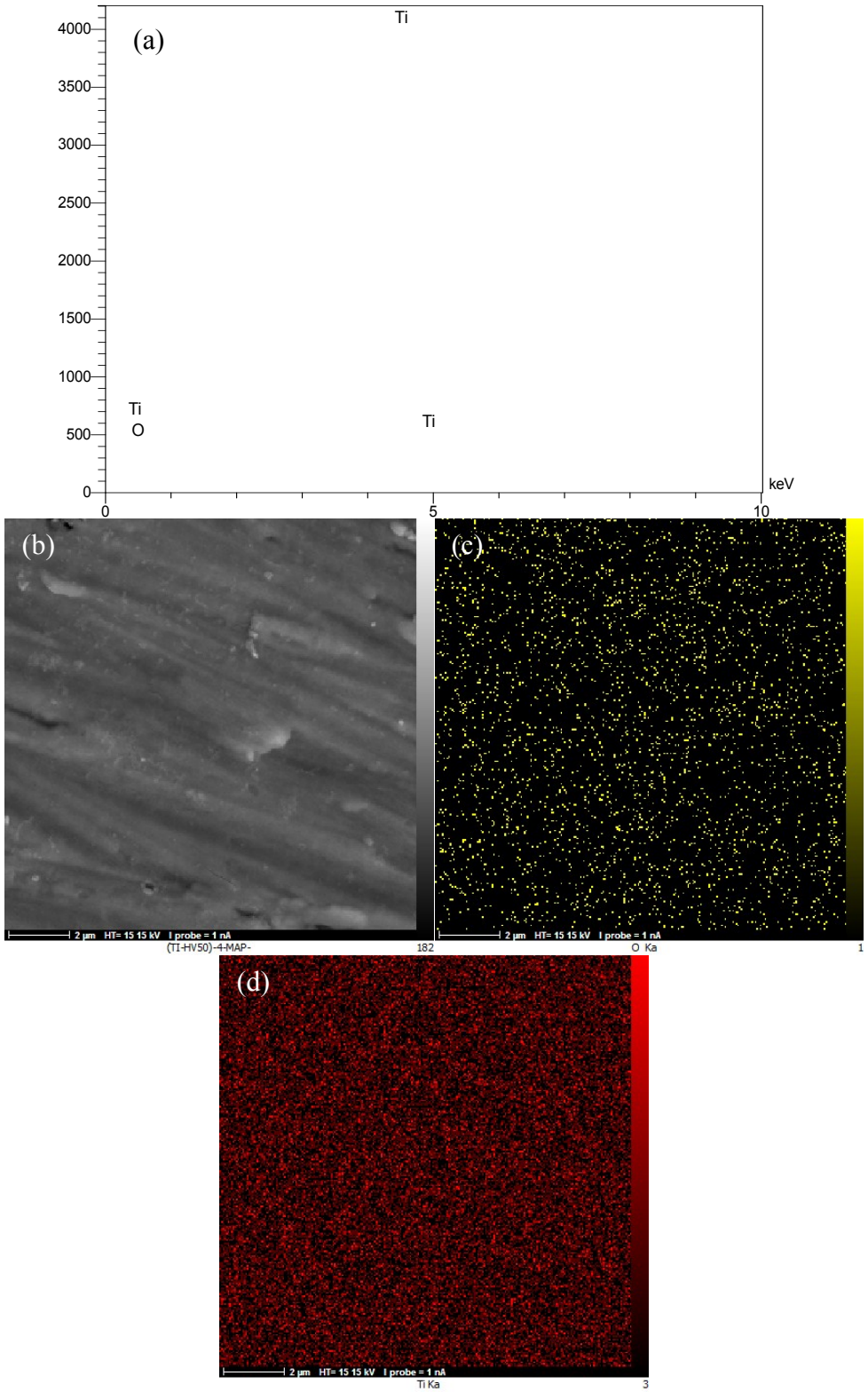

Figure S7. EDX spectra (a), selected area for measurement of EDX map (b), oxygen EDX map (c) and titanium EDX map (d) of Ti-TiOx (High-voltage) electrode. The red color represents titanium and yellow color represents oxygen.

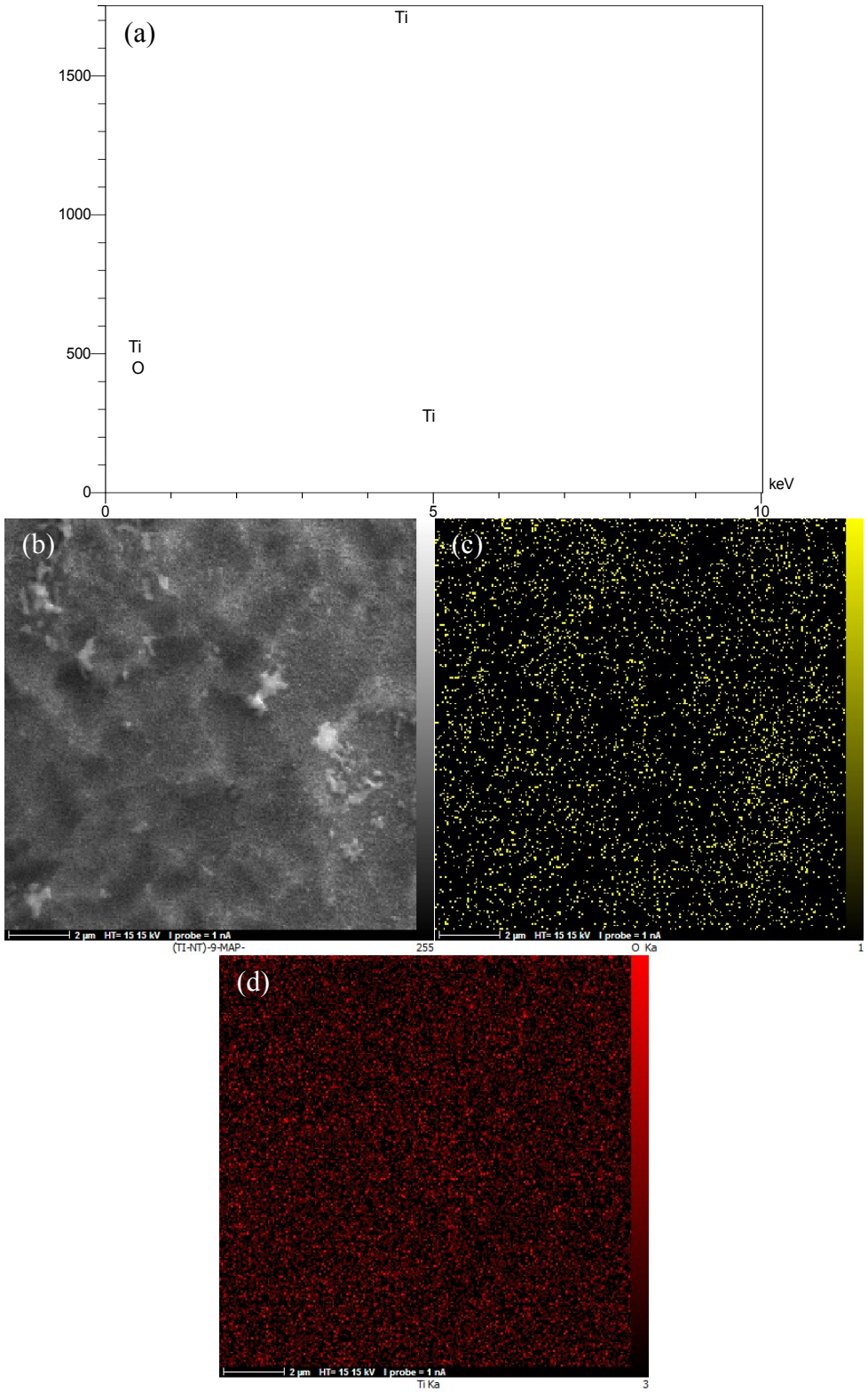

Figure S8. EDX spectra (a), selected area for measurement of EDX map (b), oxygen EDX map (c) and titanium EDX map (d) of Ti-nanotube (H_2SO_4/KF) electrode. The red color represents titanium and yellow color represents oxygen.