Enhancement of Titania Photoanode Performance by Sandwiching Copper between Two Titania Layers

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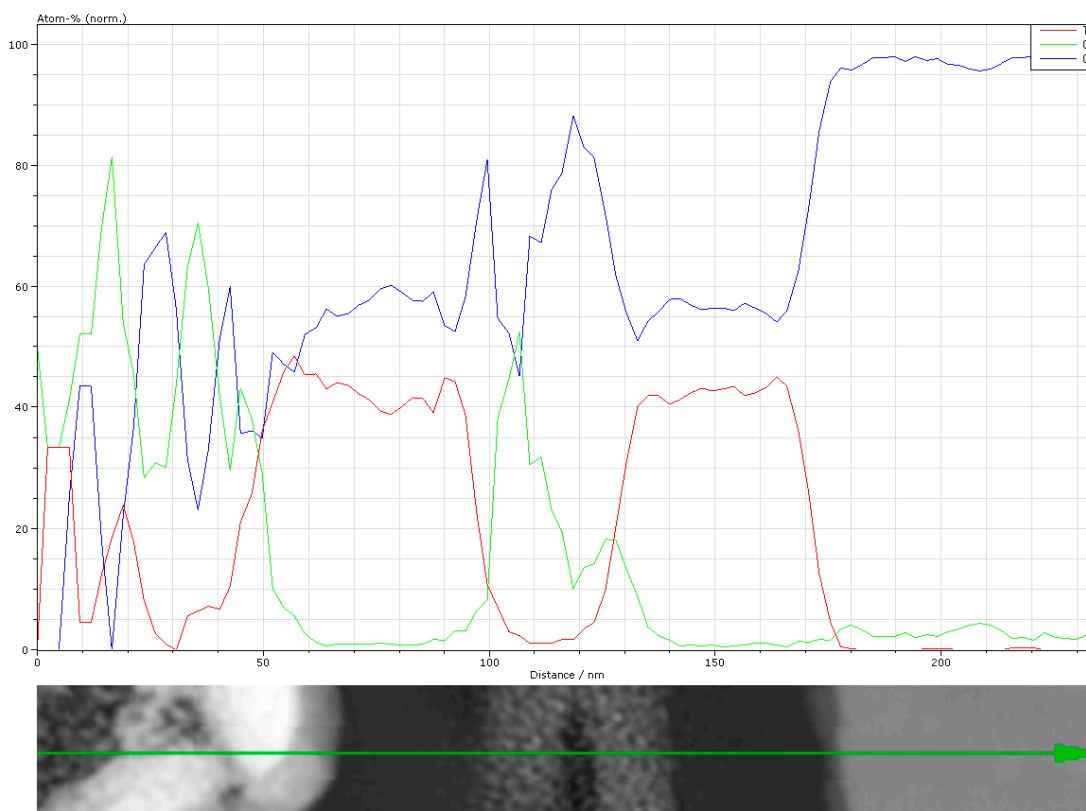
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Figure S1. the atomic dispersion of TCT-4 from the line scanning model.
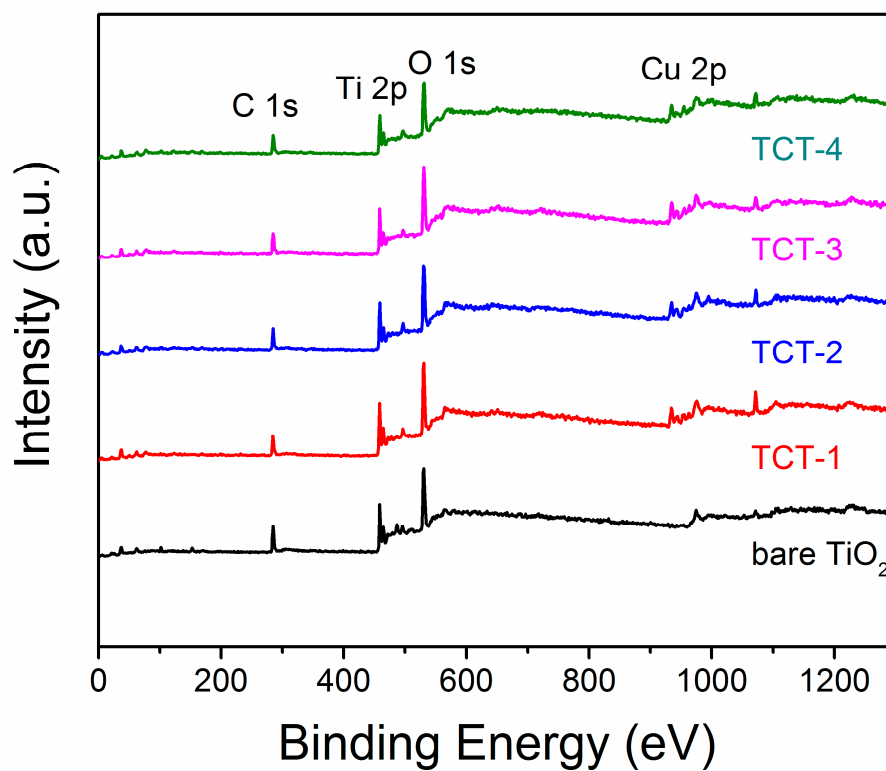
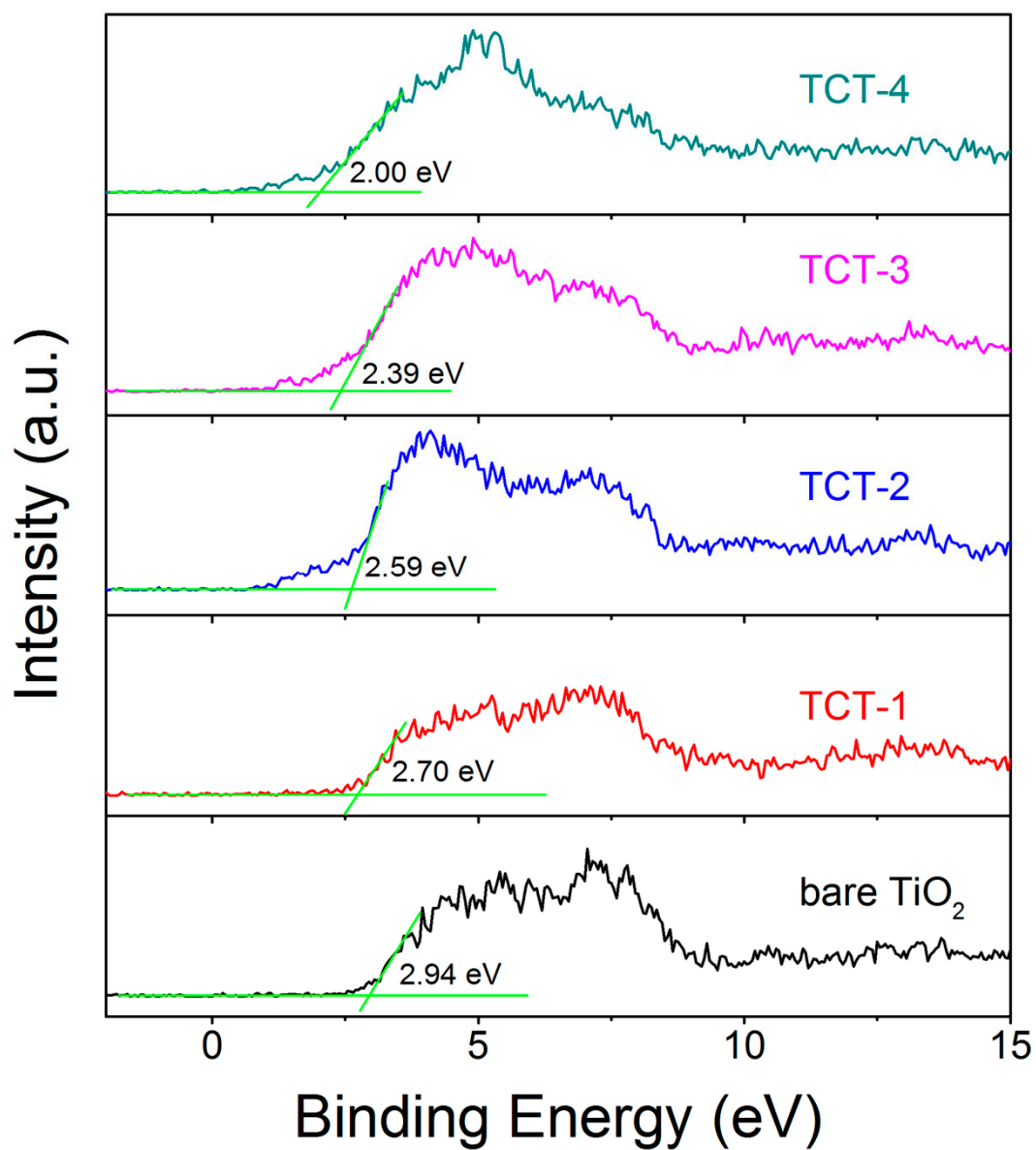**Figure S2.** XPS survey spectra of bare TiO₂ and all TCT samples respectively.

Figure S3. XPS Valence band spectra of bare TiO₂ and all TCT samples respectively.
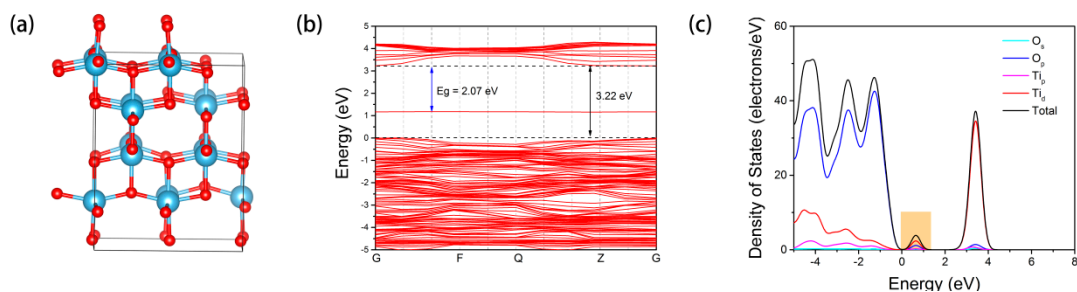

Figure S4. The lattice structure, calculated band structure and density of states (DOS) of TiO₂-Vo.
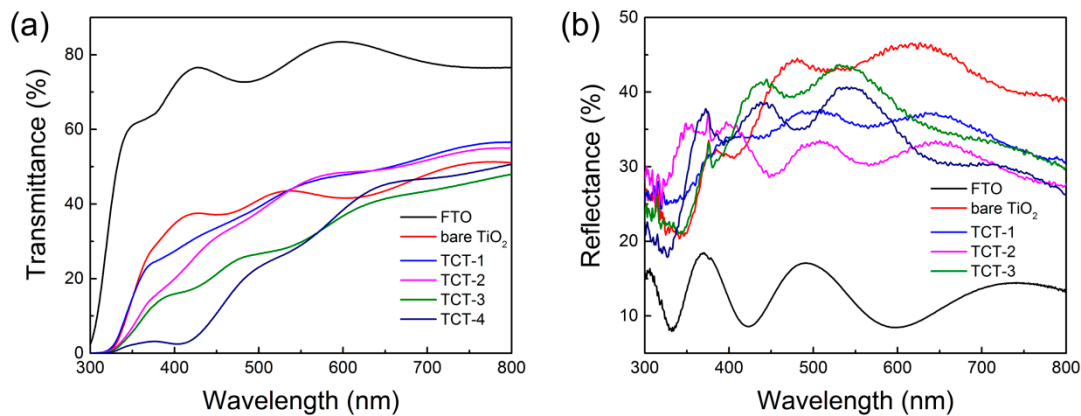
Figure S5. The transmittance (**a**) and reflectance; (**b**) of five samples from UV-vis measurement.

The absorptance spectra was calculated by the Equation:

$$A = 1-T-R \tag{1}$$

Calculations

The IPCE can be calculated by the Equation:

$$\text{IPCE}(\%) \ = \ (1240 \times J_{ph})/(\lambda \times P_{in}) \tag{2}$$

where Jph is the measured photocurrent density of the experimental sample, λ is the wavelength and Pin is the intensity of the incident light.

Mott-schottky Equation:

$$\frac{1}{C^2} \ = \ \frac{2}{N_D e \varepsilon_0 \varepsilon}(E - E_{FB} - \frac{kT}{e}) \tag{3}$$

Where C is the capacitance, N_D is the charge carrier density, e is the elemental charge, ε is the relative permittivity of material, ε_0 is vacuum permittivity, E is the applied potential in electrochemical measurement, E_{FB} is the flat band potential, k is the Boltzman constant and T is measurement temperature.