

## Supporting Information

# Surface Grafting of Ru(II) Diazonium-Based Sensitizers on Metal Oxides Enhances Alkaline Stability for Solar Energy Conversion

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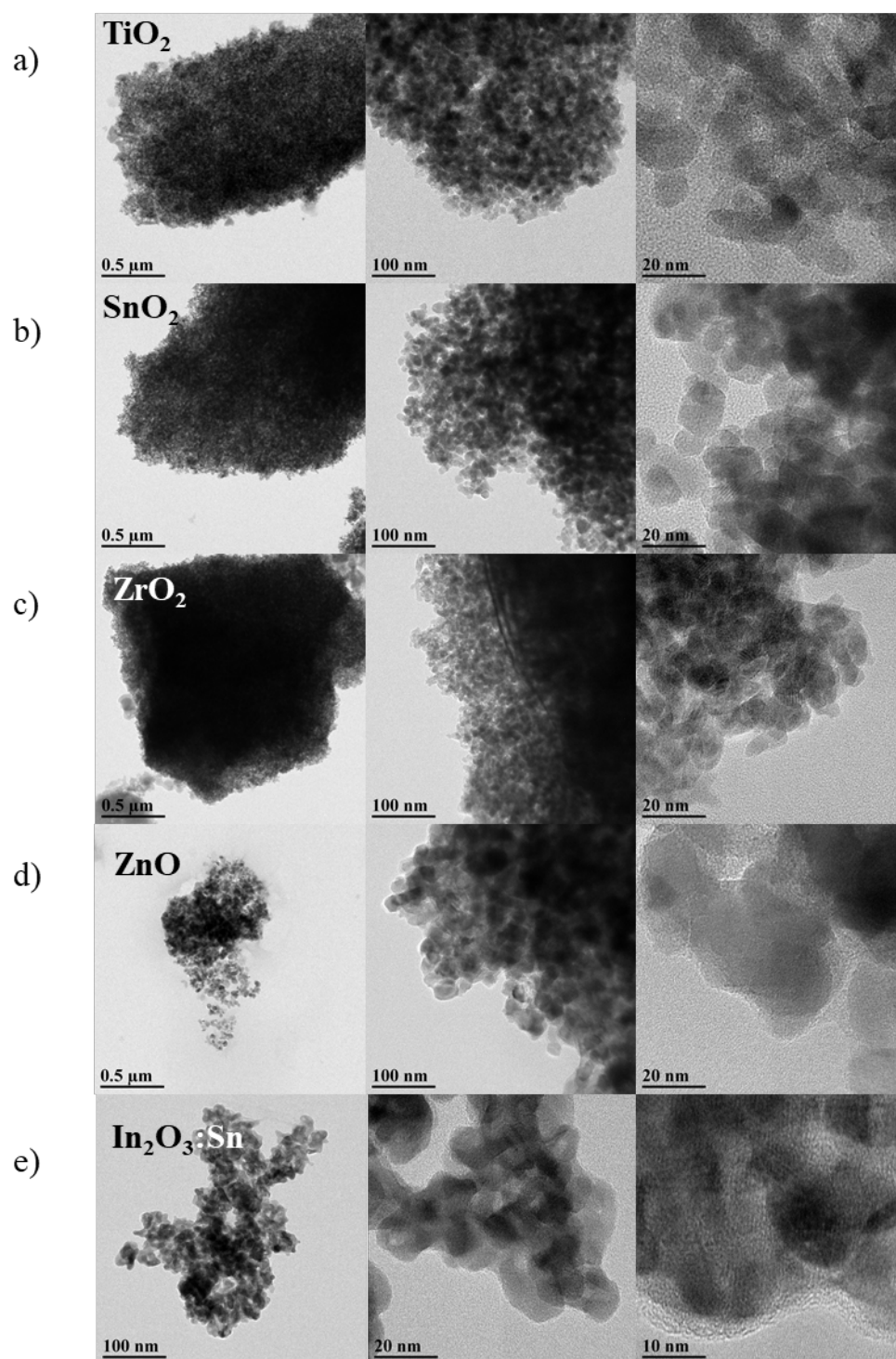


Figure S1: TEM images of MO<sub>x</sub> nanoparticles scraped from thin films. Types of MO<sub>x</sub> are separated as a) TiO<sub>2</sub>, b) SnO<sub>2</sub>, c) ZrO<sub>2</sub>, d) ZnO, and e) In<sub>2</sub>O<sub>3</sub>:Sn.

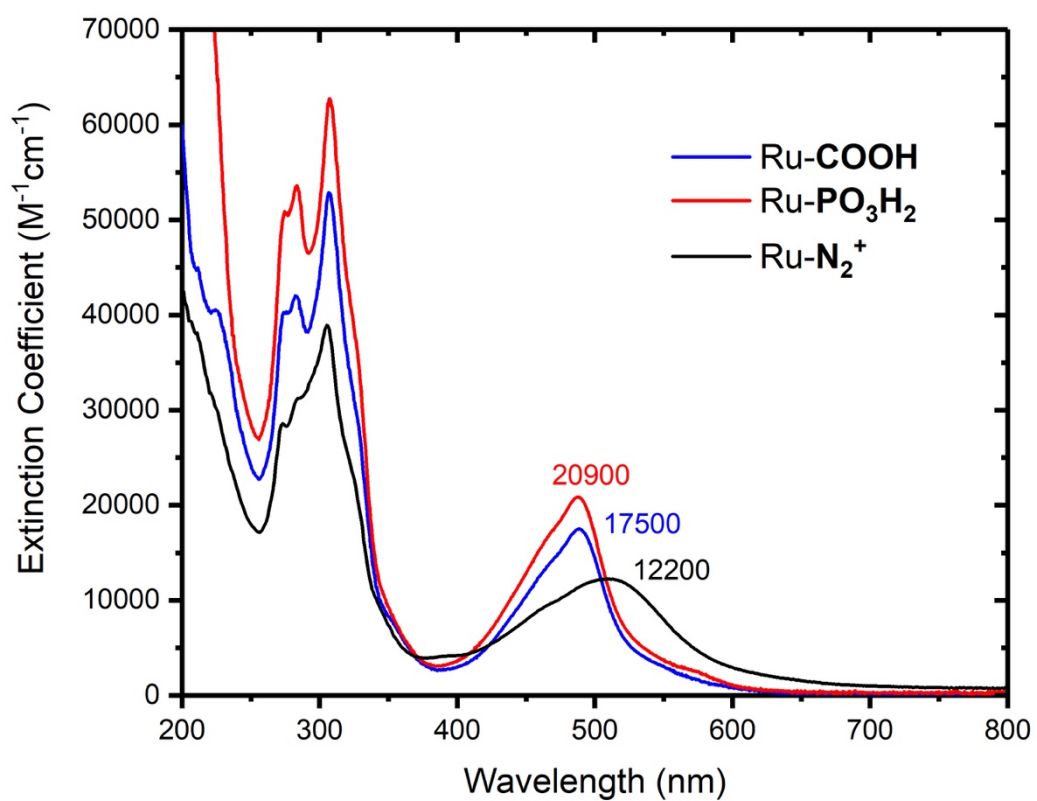


Figure S2: Extinction coefficients spectra of Ru- $\text{N}_2^+$  (black), Ru- $\text{PO}_3\text{H}_2$  (red), and Ru- $\text{COOH}$  (blue) dissolved in  $\text{CH}_3\text{CN}$ .

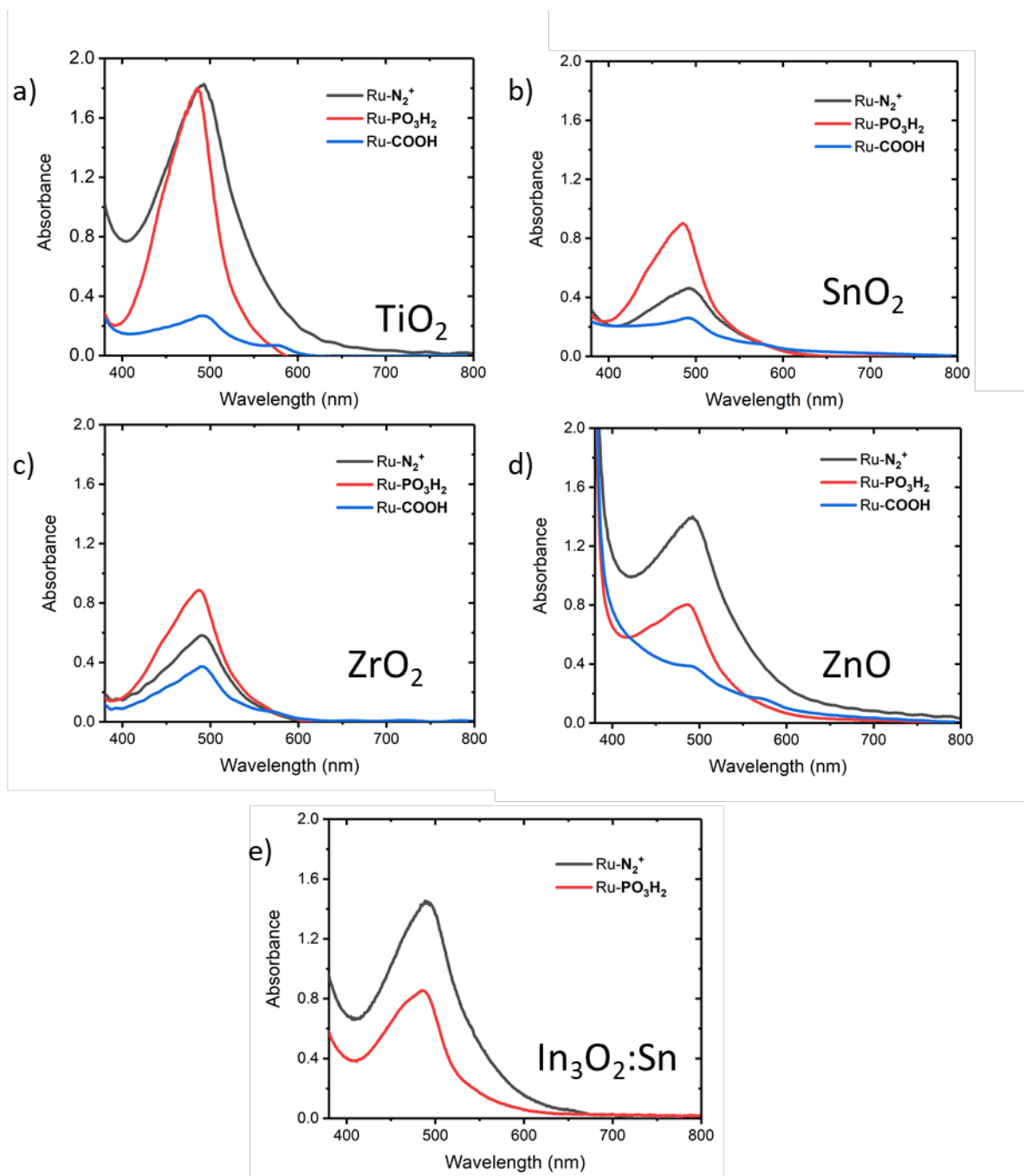


Figure S3: UV-Vis spectra of all sensitizers bound on MO<sub>x</sub> surfaces showing relative absorbance intensity. Ru-N<sub>2</sub><sup>+</sup> (black), Ru-PO<sub>3</sub>H<sub>2</sub> (red), and Ru-COOH (blue) are shown for a) TiO<sub>2</sub>, b) SnO<sub>2</sub>, c) ZrO<sub>2</sub>, d) ZnO, and e) In<sub>2</sub>O<sub>3</sub>:Sn. Ru-N<sub>2</sub><sup>+</sup> grafted films were made by electrografting at held potentials given in Table 1 using a 2 mM Ru-N<sub>2</sub><sup>+</sup> solution in 100 mM TBAClO<sub>4</sub> CH<sub>3</sub>CN for 30 min. Ru-PO<sub>3</sub>H<sub>2</sub> and Ru-COOH were adsorbed by soaking films in concentrated solutions in CH<sub>3</sub>CN.

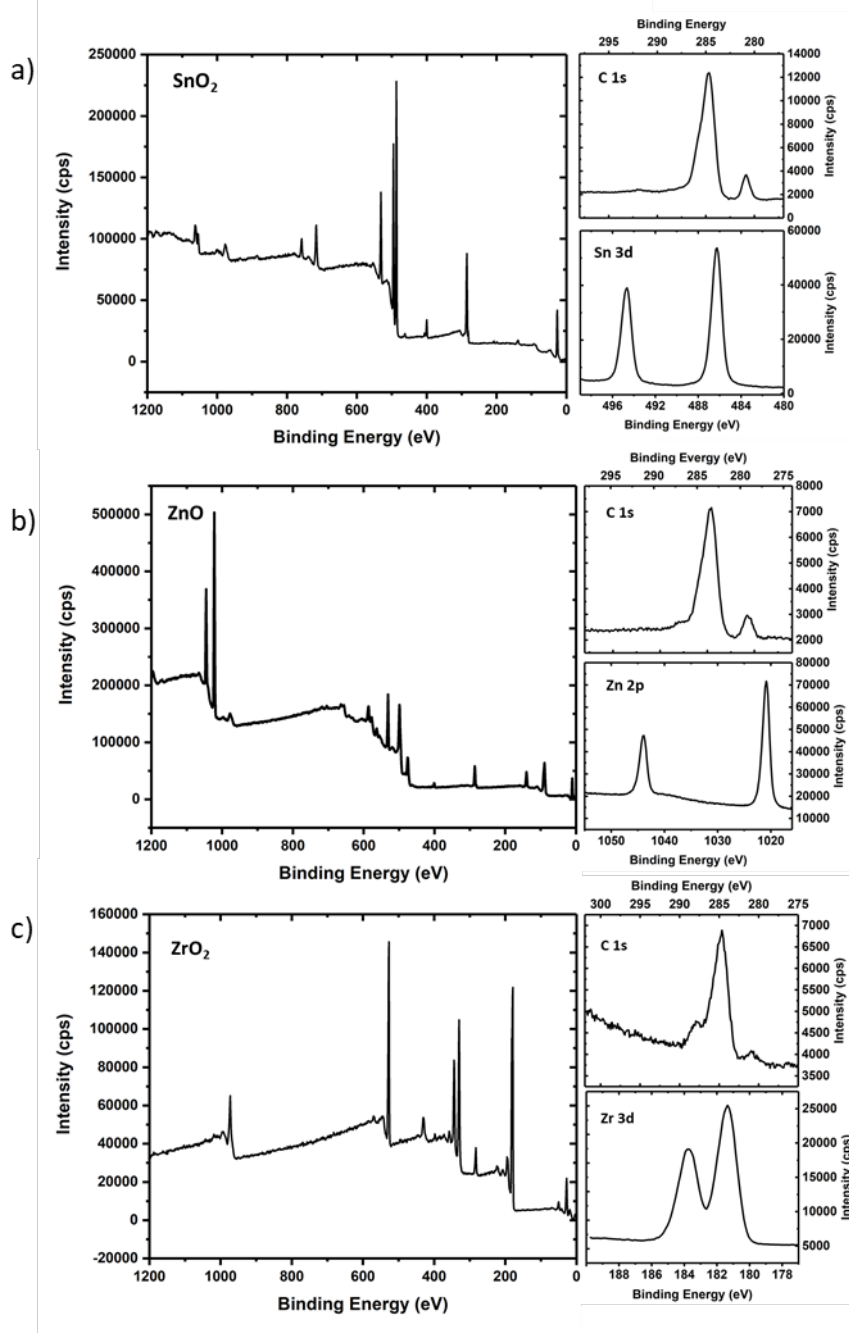


Figure S4: XPS spectra of a)  $\text{SnO}_2$ , b)  $\text{ZnO}$ , and c)  $\text{ZrO}_2$  films sensitized with  $\text{Ru-N}_2^+$ . High definition spectral regions verify the presence of the sensitizer through the presence of a Ru3d peak (C1s) and show no detectable change in oxidation state of the metal.

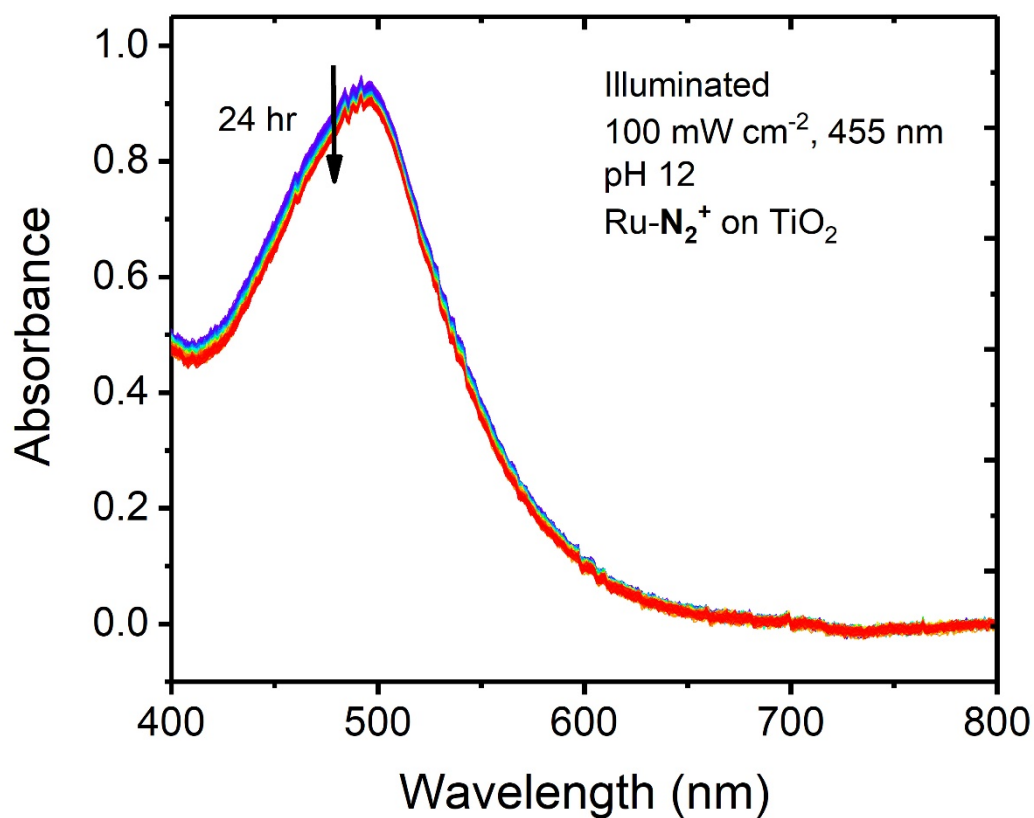


Figure S5: UV-visible spectra of Ru-N<sub>2</sub><sup>+</sup> on TiO<sub>2</sub> in pH 12 aqueous solution as it is illuminated with 455 nm, 100 mW cm<sup>-2</sup> light over 24 hrs. No spectral shift is observed, and little change in absorbance occurs.