Supplementary Materials: Photocatalytic TiO_2 Nanorod Spheres and Arrays Compatible with Flexible Applications

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The scanning electron microscopy (SEM) images in Figure S1 shows a cracked micro-sized sphere that evidences the nanorods radially arranged.

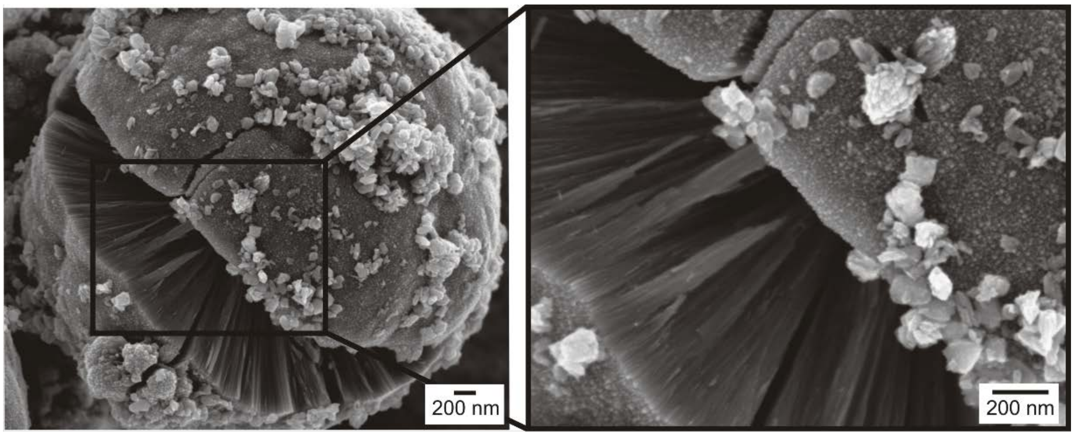

Figure S1. SEM images of the 80 °C H_2O nanorod spheres showing the nanorods radially arranged. The inset evidences the nanorod structures inside the sphere.

The energy dispersive X-Ray spectroscopy (EDS) analyses showed homogeneous distributions of Ti and O in both materials produced. The C map is presented as the substrate is from polymer origin (Figure S2).

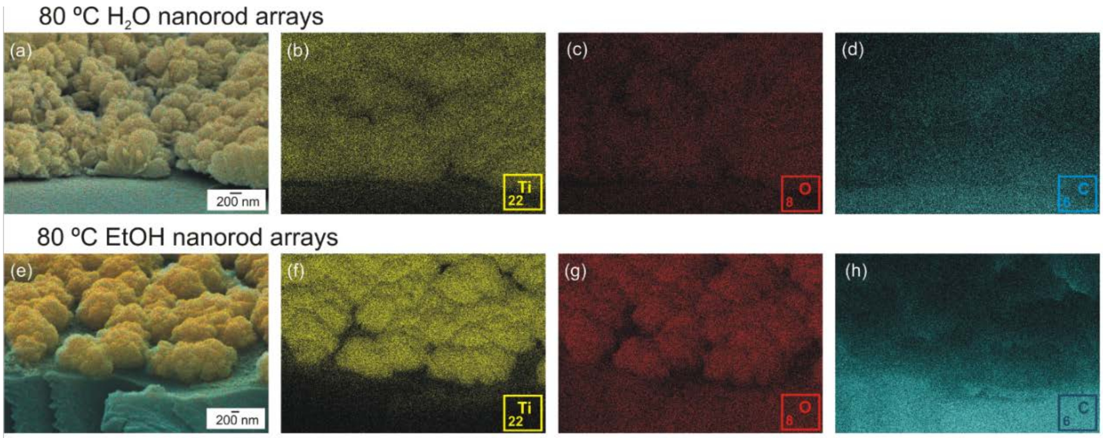

Figure S2. Cross-section SEM images (artificial colored) of the: (**a**) 80 °C H_2O; and (**e**) 80 °C EtOH nanorod arrays grown on ZnO seeded PET substrates, together with the corresponding X-ray maps of Ti: (**b**,**f**); O (**c**,**g**); and C (**d**,**h**).

Figure S3 shows the rhodamine B absorbance spectra at different ultraviolet (UV) exposure times with the different TiO_2 materials acting as photocatalytic agents.

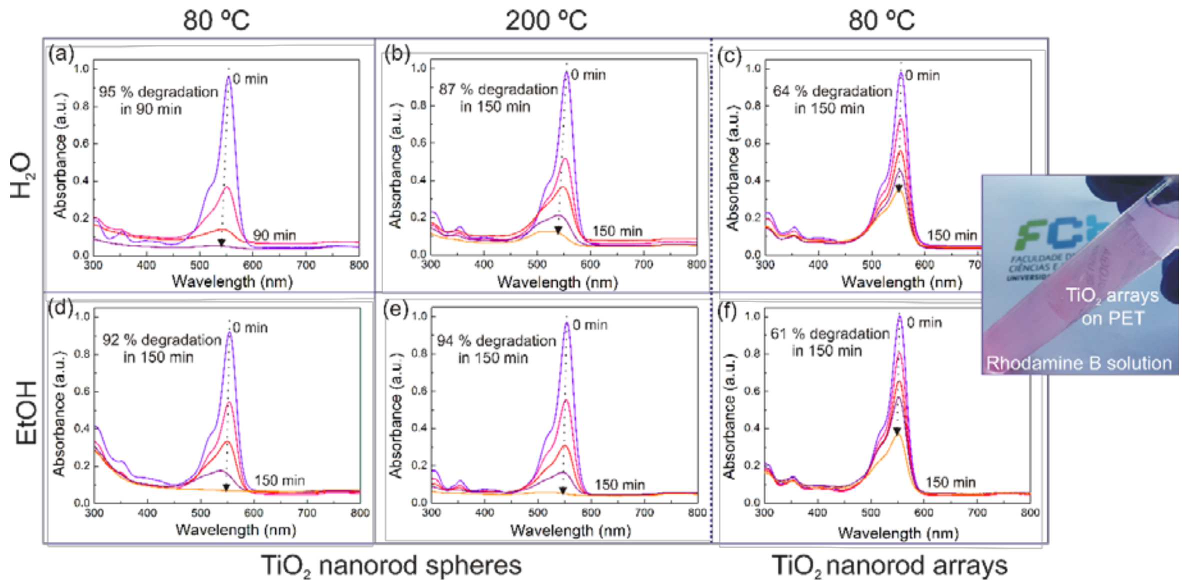

Figure S3. Rhodamine B absorbance spectra at different UV exposure times for the TiO_2 nanorod spheres produced with water at: (**a**) 80 °C; and (**b**) 200 °C; and with ethanol at: (**d**) 80 °C; and (**e**) 200 °C. The TiO_2 nanorod arrays grown on PET were also tested as photocatalystis at 80 °C for: (**c**) water; and (**f**) ethanol. The photograph illustrates the PET substrate with the TiO_2 nanorod arrays covering a tube containing the pollutant solution. The absorbance spectra have not been normalized.

Rhodamine B degradation ratio (C/C_0) *vs.* UV exposure time for both the 80 °C H_2O nanorod spheres and Degussa P25 powders (Figure S4). The spheres show comparable degradation behavior under UV radiation of the most used commercial TiO_2 powder.

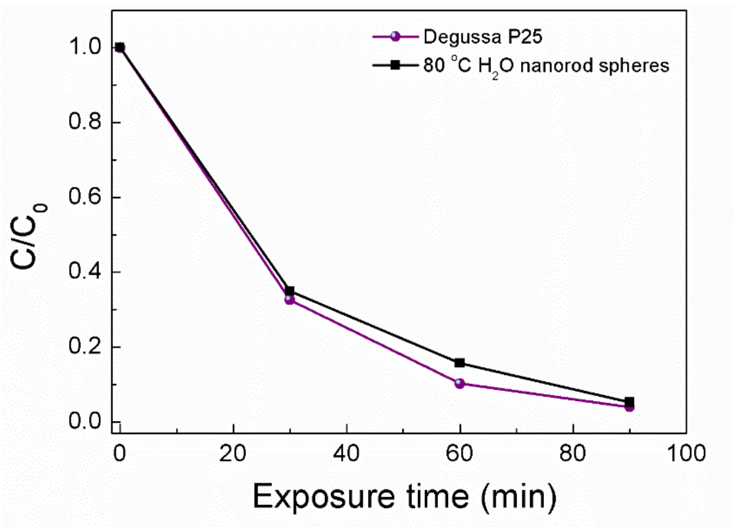

Figure S4. Rhodamine B degradation ratio (C/C_0) vs. UV exposure time for the 80 °C H_2O nanorod spheres and Degussa P25.

The blank rhodamine B solution and the rhodamine B solution with the powder photocatalysts were tested over time with a fixed wavelength of 500 nm using a PerkinElmer lambda 950 UV/VIS/NIR spectrophotometer. The absorbance over time confirmed that the 80 °C H_2O nanorod spheres show the higher absorption at the 500 nm wavelength suggesting that it can be more effective for applications in the visible/solar radiation (Figure S5).

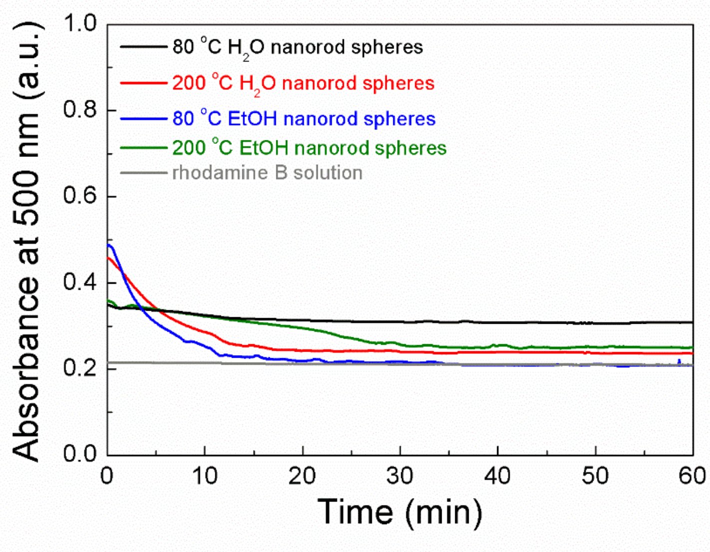

Figure S5. Absorbance measurements over time at 500 nm for all the TiO_2 nanorod spheres.

Figure S6 shows the SEM image of the ZnO seed layer prior to microwave synthesis. The ZnO seed thickness average is 50.7 ± 3.6 nm.

Figure S6. Cross-section SEM image of the ZnO seed layer prior to microwave synthesis.