Supplementary Material for:

Syntheses and Structural Understanding of Ti-Ta Alloy Based Nanotubular Oxide Photocatalyst

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1. Alloy XRD

Ti–Ta (50-50 at %) alloy was prepared starting from pure metals (>99.9%) by melting in a plasma arc furnace. Figure S1, shows only characteristic reflections of the long-range orders of the Ta crystal cell were identified. The Tantalum has a crystalline structure bbc, thus, the X-ray diffraction proves that the substitution of the Ti atoms in the Ta structure was complete, ensuring that the substrate is composed only of the β phase.

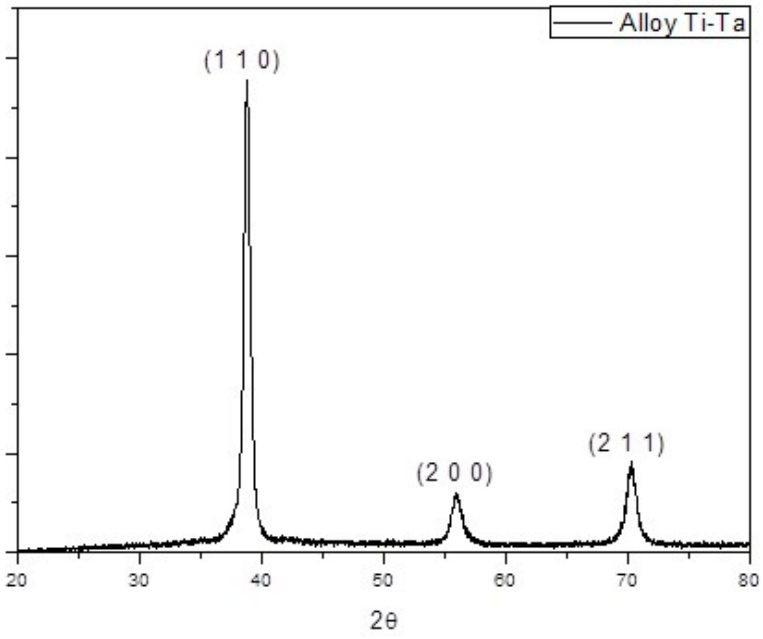

Figure S 1. XRD patterns of Ti-Talloy.

2. Anodization

The anodization was performed in a system composed of electrochemical reactor, voltage source, multimeter, computer and software to control the applied voltage and store the data during the anodizing process (Figure S2).

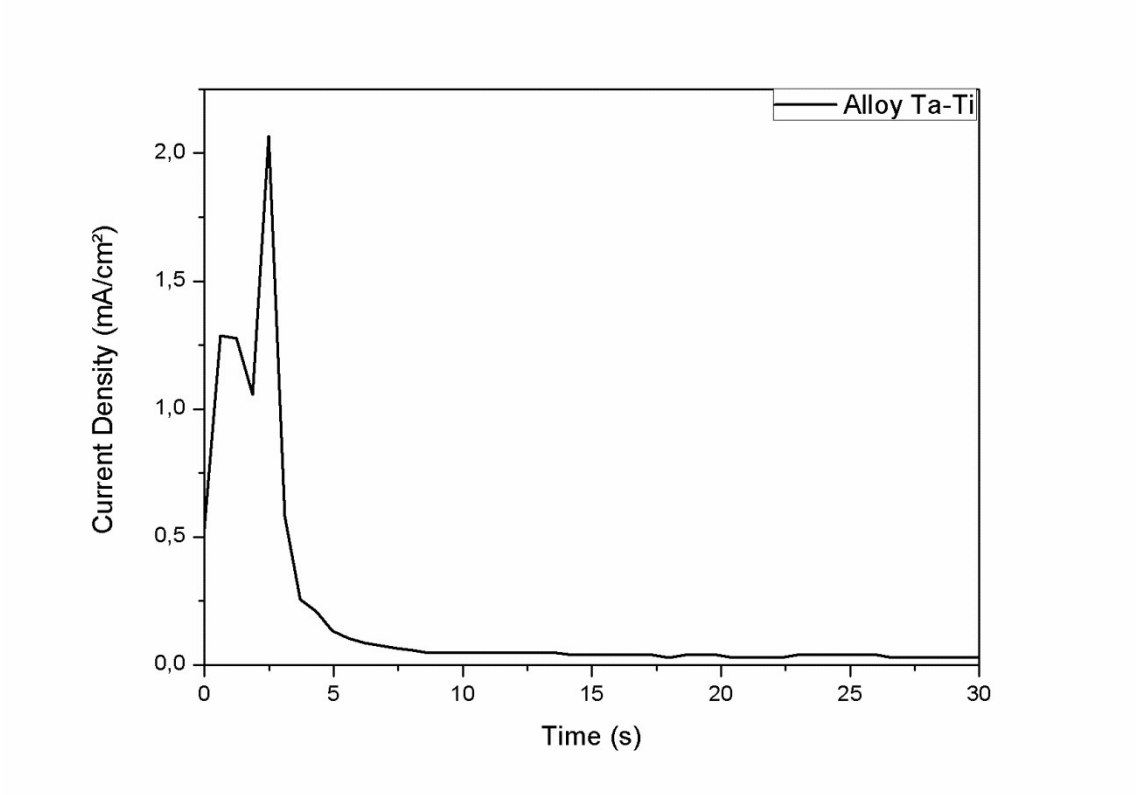

Figure S 2. Current density curves for anodization of Ta-Ti alloy discs at 50 V, 30 min and 55 °C.

3. HPLC Analisys

The liquid phase analysis was performed using the high performance liquid chromatography (HPLC) method, together with an interface (model 350) and a refractive index detector. The method used used the AMINEX HPX-87H type column, suitable for the separation of the acids. As a mobile phase, a solution of 0.005 $mol.L^{-1}$ sulfuric acid with a flow rate of 0.6 mL / min was used. The column temperature was maintained at 50 °C by means of the thermally controlled furnace. In order to determine the concentrations of the products and the reagent the external standardization method was used, where solutions of known concentrations were injected and their respective areas were obtained. Figure S3, shows the chromatograms for the samples before and after solar irradition.

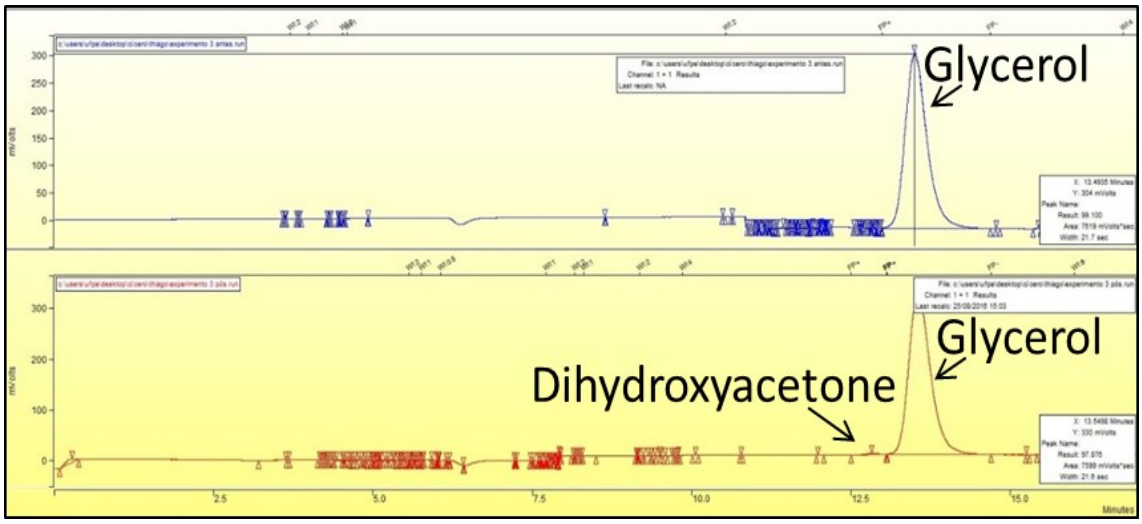

Figure S3. Chromatograms of glycerol liquid phase HPLC; analyses were performed before and after a 5h cycle.