

Supplementary Materials: Preparation of Nanoparticle Porous-Structured BiVO_4 Photoanodes by a New Two-Step Electrochemical Deposition Method for Water Splitting

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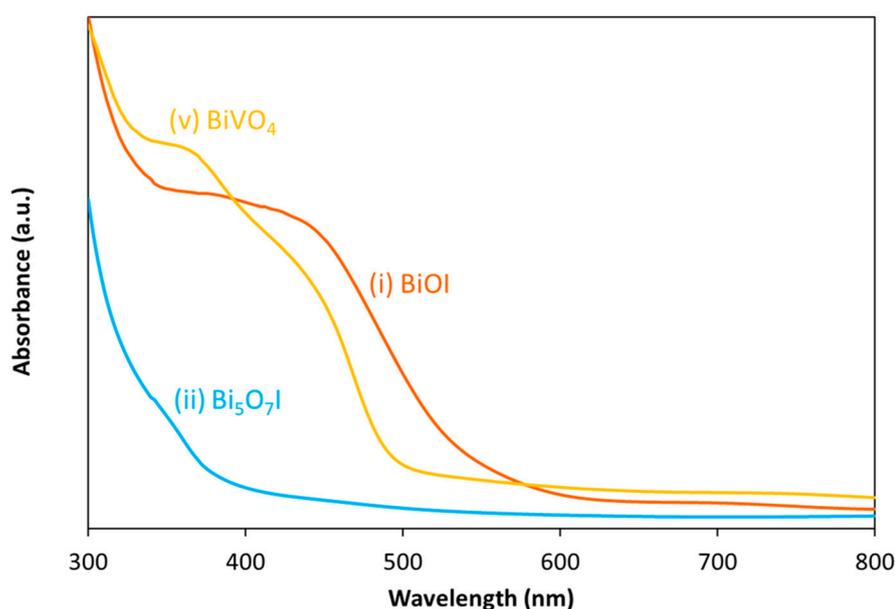


Figure S1. The ultraviolet–visible absorption spectra of (i) BiOI (orange), (ii) $\text{Bi}_5\text{O}_7\text{I}$ (light blue) and (v) BiVO_4 (yellow) films. The numbers (i, ii and v) correspond to the samples in Figure 1. The UV-vis absorption spectra of the films were analysed on a spectrophotometer (JASCO V-780) with an integrating sphere that was operated in the transmission mode.

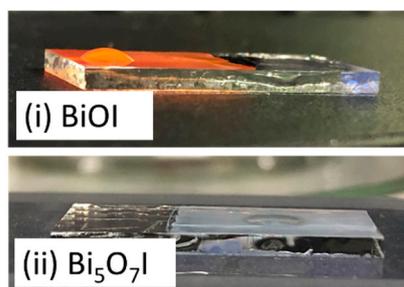


Figure S2. These photographs show the hydrophobicity of the film surface: (i) BiOI and (ii) $\text{Bi}_5\text{O}_7\text{I}$.

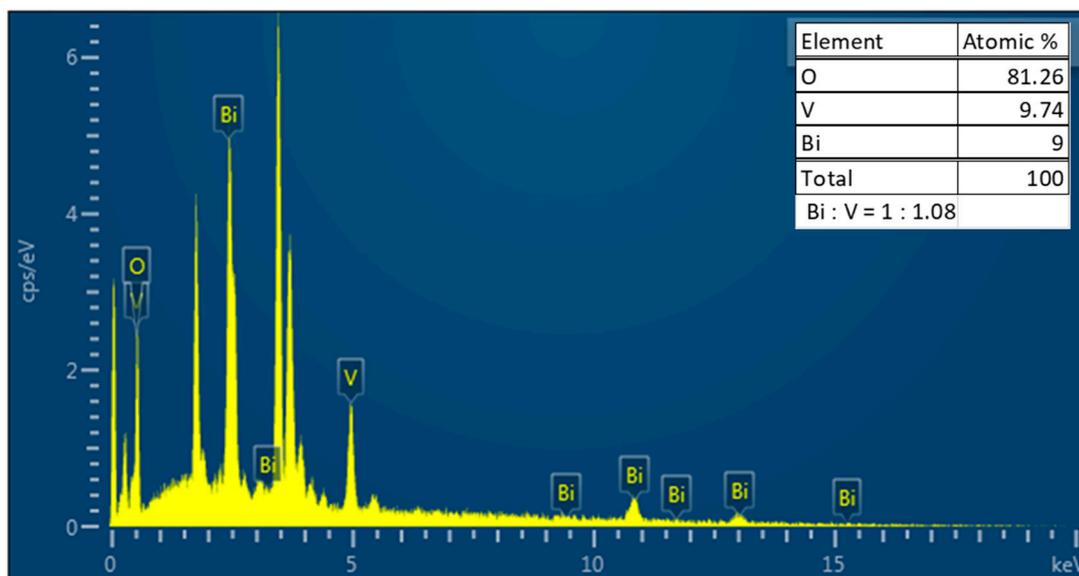


Figure S3. EDS elemental analysis spectrum of the pure BiVO_4 film in Figure 1-(v).

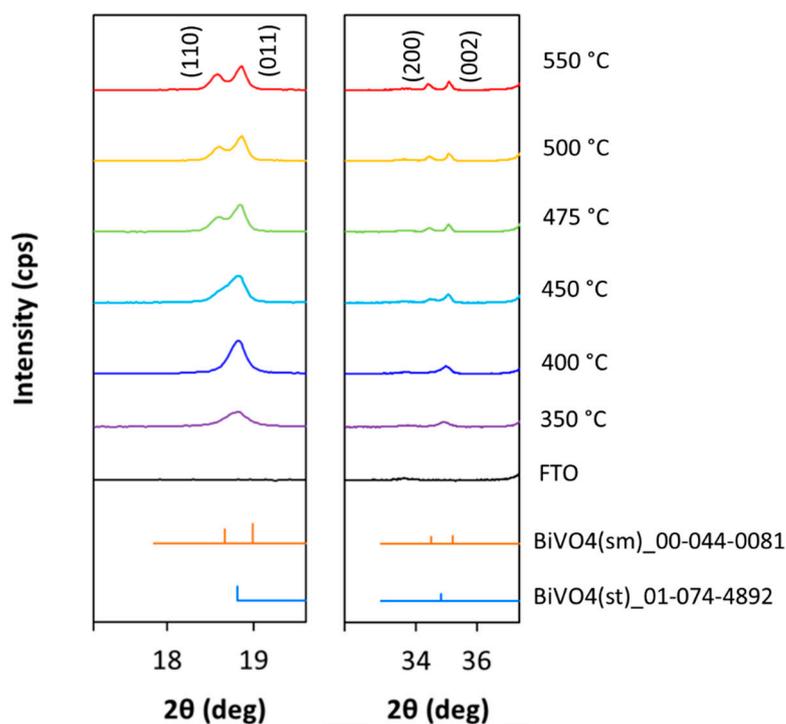


Figure S4. An enlarged view of the XRD patterns of BiVO_4 films obtained by Bi_2O_3 and V_2O_5 conversion reaction treated at several different temperatures, from the top to the bottom: 550, 500, 475, 450, 400 and 350 °C, as well as the FTO substrate. For reference, scheelite-structured monoclinic BiVO_4 (JCPDS No. 00-044-0081) and scheelite-structured tetragonal BiVO_4 (JCPDS No. 01-074-4892) are cited. These films were prepared according to the procedure in Figure 1.

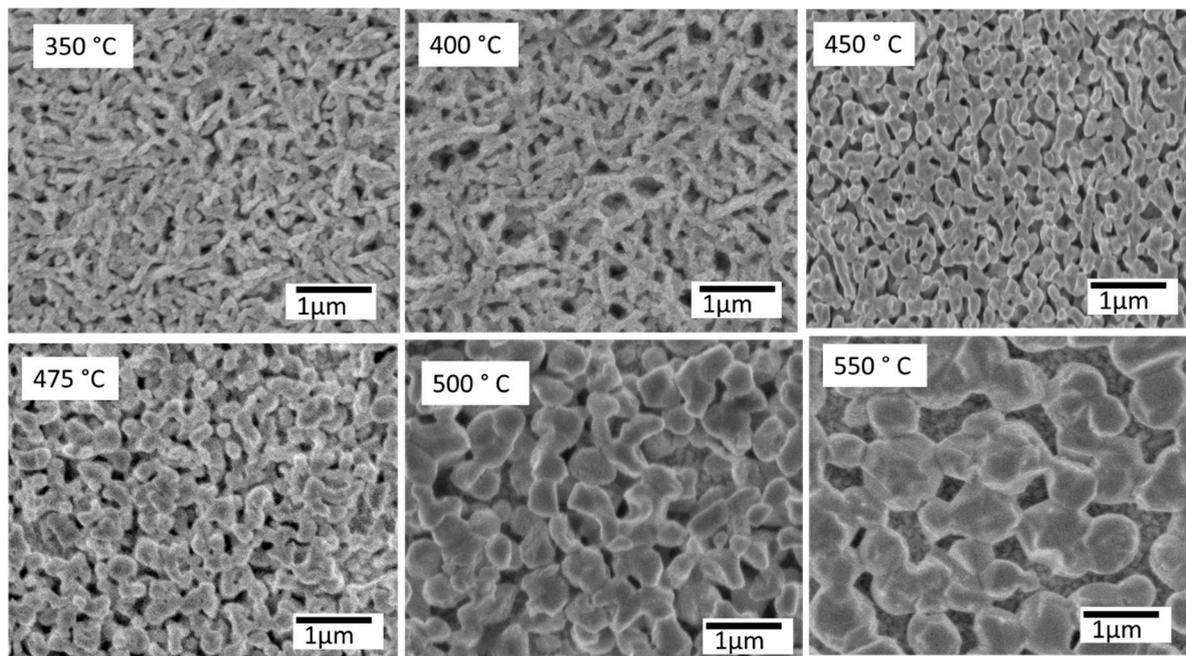


Figure S5. Top view SEM images of BiVO₄ films prepared with Bi–V–O conversion reaction processed at several different temperatures: 350 °C, 400 °C, 450 °C, 475 °C, 500 °C, and 550 °C. These films were prepared according to the procedure in Figure 1.

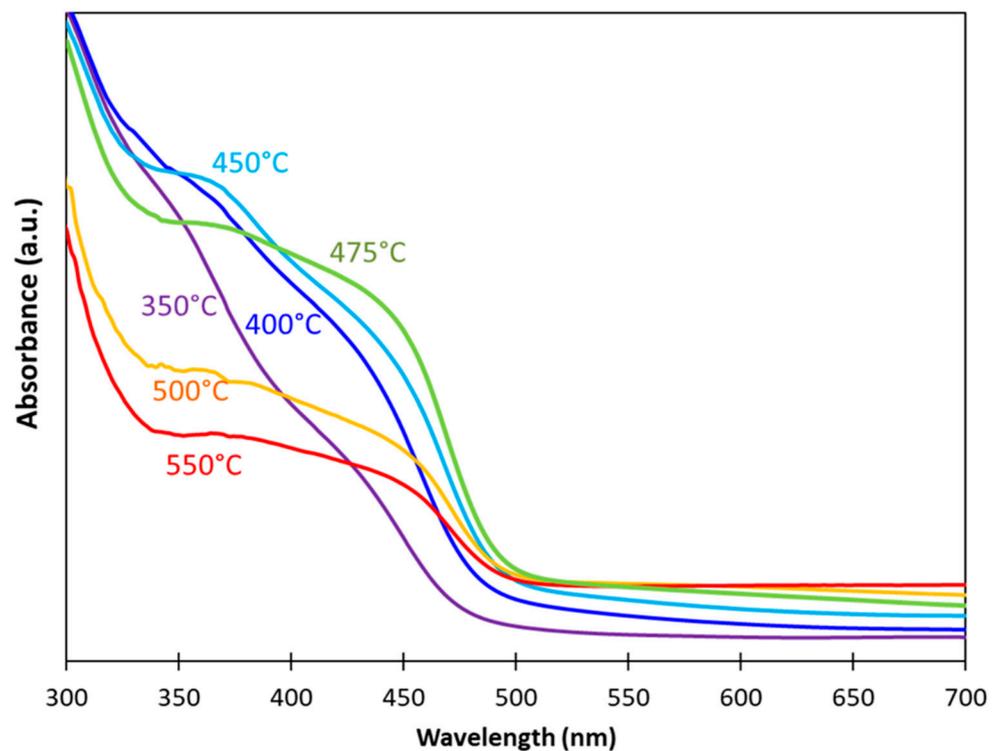


Figure S6. The ultraviolet–visible absorption spectra of BiVO₄ films by Bi–V–O conversion process at 350 °C to 550 °C according to Figure 1. The absorption spectra of the films were analysed on a spectrophotometer (JASCO V-780) with an integrating sphere that was operated in the transmission mode.

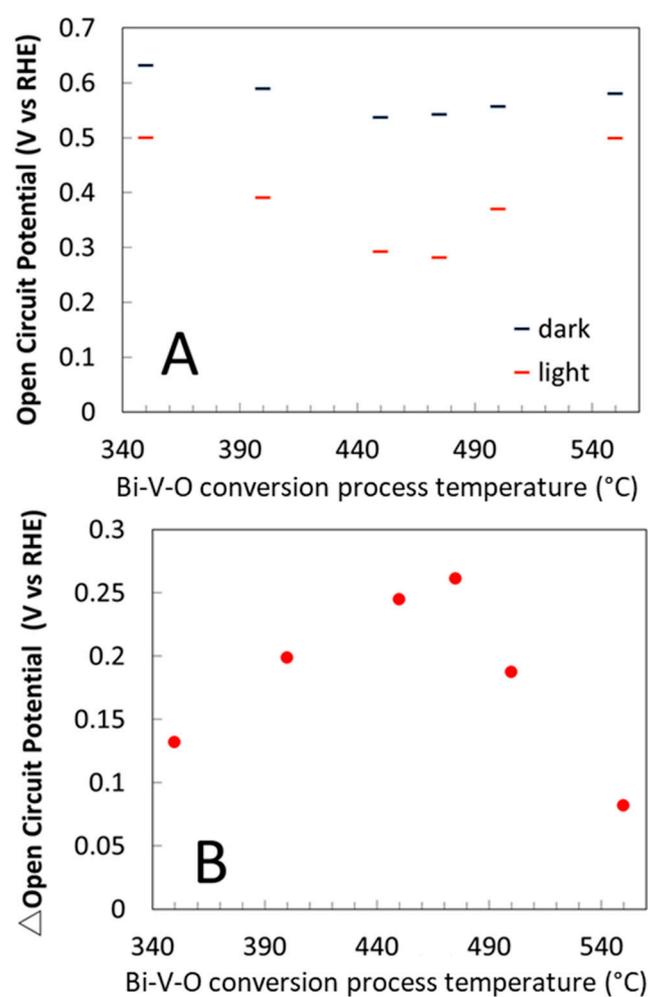


Figure S7. Open circuit potential (A) in the dark and illuminated, (B) the difference between light and dark of the films in Figure S7-A. Data were collected in 0.5 mol/L potassium borate aqueous solution (pH 9.5). Light source: solar simulated light irradiation with light intensity of 100 mW/cm².

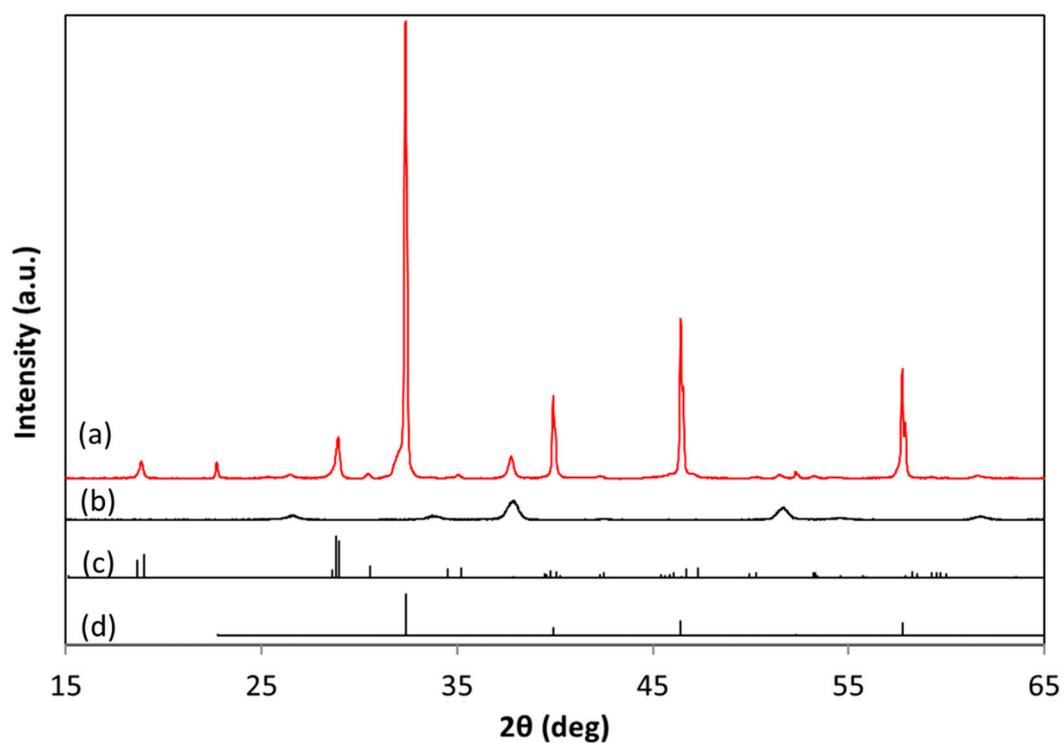


Figure S8. XRD patterns of (a) Ru/SrTiO₃:Rh-BiVO₄ sheet, (b) FTO substrate, (c) reference scheelite-structured monoclinic BiVO₄ (JCPDS no.00-044-0081) and (d) reference SrTiO₃ (JCPDS no. 01-081-9509).