

Effect of RF power on the composition of BiVO₄ thin-film photoanodes sputtered from a single target

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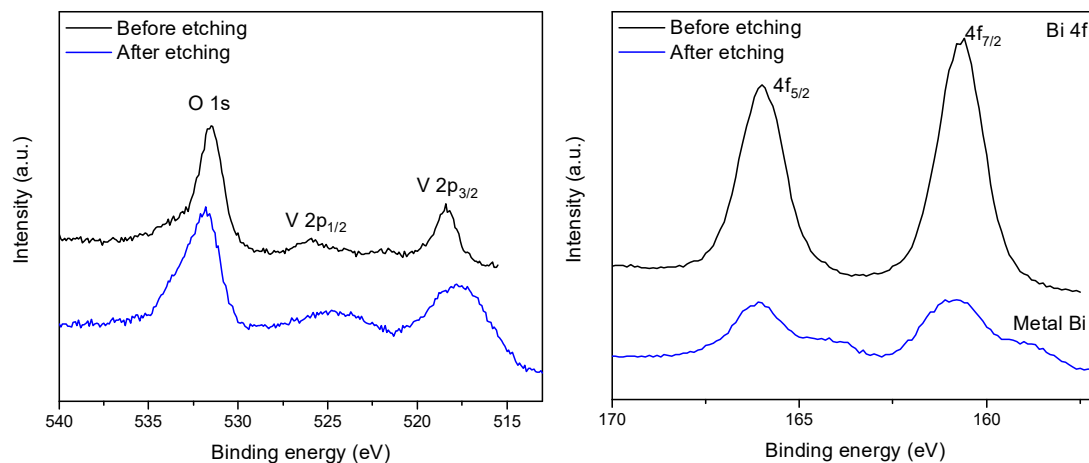


Figure S1. XPS spectra of the film before and after argon ion etching. The surface of the film exhibits the excess V after etching (according to the peak area), reflecting the preferential sputtering of Bi in the etching. Meanwhile, the metal state of Bi appears in the etched film, suggesting the oxygen was preferentially sputtered, too. The argon plasma was produced by the electric field of 300 V with the Ar pressure of 5×10^{-2} Pa, and etching time was 60 s.

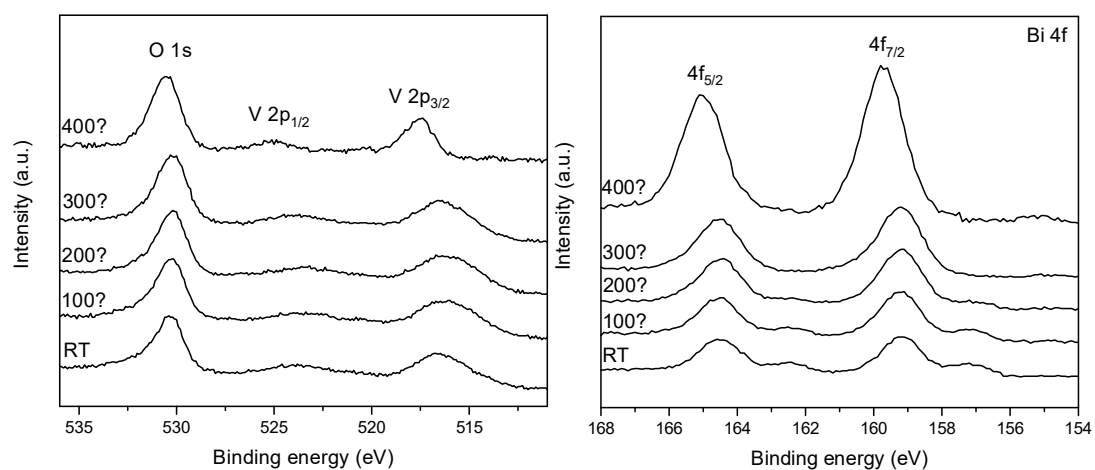


Figure S2. XPS spectra of the etched film at different temperatures in the vacuum ($\sim 5 \times 10^{-5}$ Pa). The metal state of Bi gradually disappears with increasing temperature. At approximately 200 °C, the oxygen starts diffusing from bulk to surface. Until the temperature went up to 400 °C, the ratio of Bi and V changed. Therefore, the Bi diffused from bulk to surface.

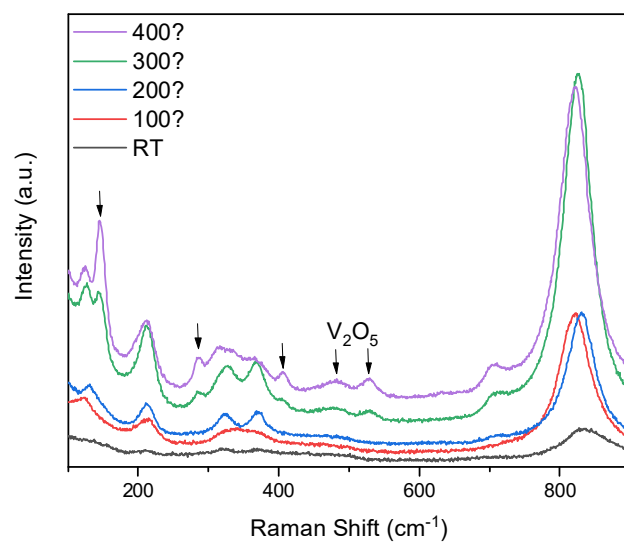


Figure S3. Raman spectra of films prepared at various substrate temperatures. With the increasing temperature, the Raman modes of V_2O_5 appear. It implies the different adsorbed amount of Bi and V on substrate resulting from temperature.

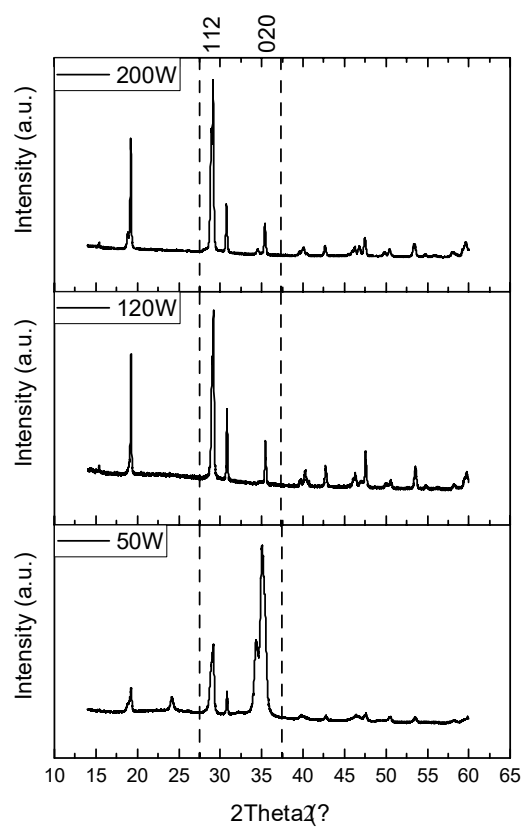


Figure S4. XRD patterns of the prepared BiVO₄ films under different RF powers by using BiV_{1.5}O_x target. Comparing with the structure of films prepared using BiVO₄ target, it can be demonstrated that the orientation changed from (020) to (112), which may be caused by increased vanadium in the films.

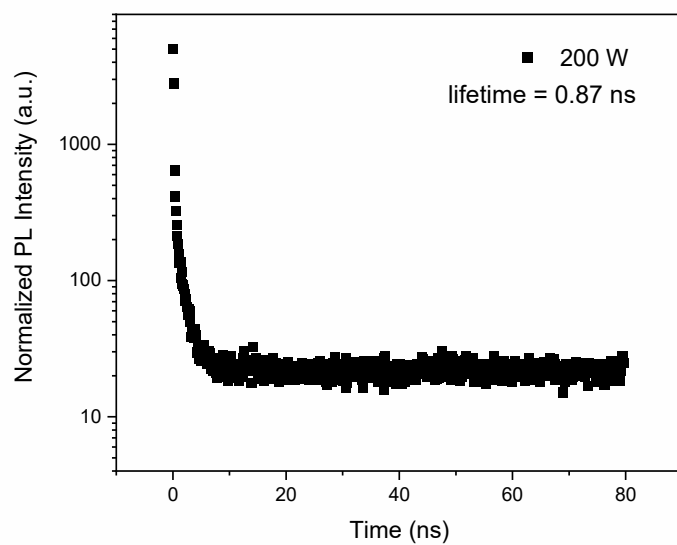


Figure S5. TRPL decay of BiVO₄ films deposited under 200 W on the glass, collected at ~660 nm. The wavelength of excitation laser is 400 nm.