Electronic Supplementary Information for Dalton Transactions

Supporting Information

Effects of molybdenum substitution on the photocatalytic behavior of $BiVO_4$

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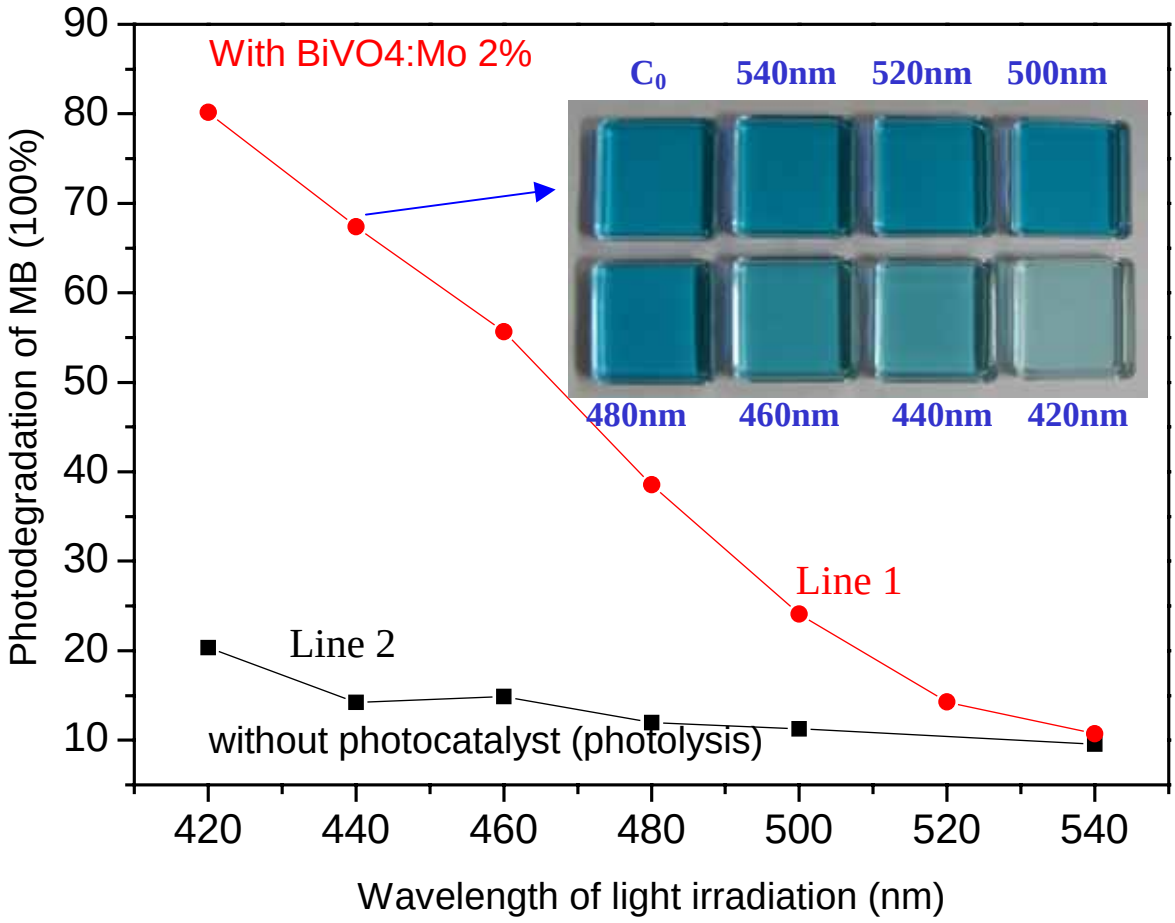

Figure S1. Wavelength dependence of MB degradation over $BiVO_4$:Mo (2at. %) photocatalyst on the cutoff wavelength of incident light. *Catalyst: 0.1g; MB 16ppm; Time: 1h; Lamp: Xe Lamp with different filter and water filter.*

The wavelength dependence of MB degradation on the cutoff wavelength of incident light over Mo doped $BiVO_4$ was examined to exclude the effect of dye-sensitization on the activity. Line 1 in Figure S1 shows the degradation of MB solution over $BiVO_4$: Mo 2 at. % photocatalyst with different light irradiation. *Pictures of MB solution before photocatalytic degradation and after photocatalytic reaction over $BiVO_4$:Mo (2at. %) was attached as an insert figure.* The degradation of MB solution over photocatalyst was caused by the photocatalytic degradation and the photolysis of MB, simultaneously, with visible light irradiation. The effect of photolysis on MB degradation was determined, which is shown as Line 2 in Figure S1. The photocatalytic degradation

of MB over $BiVO_4$:Mo photocatalyst was then obtained by subtracting the effect of photolysis processes from Line 1, that is: Line 3=Line 1– Line 2. Two ways approached for photocatalytic MB degradation over a photocatalyst: one is by a direct photocatalytic reaction happened on the photocatalyst, the other one is by a dye-sensitization process as that observed on TiO_2 for some dye degradation. As shown in Figure S2, the photocatalytic degradation of MB (Line 3) was in good consistent with the absorption edge of $BiVO_4$:Mo photocatalyst, indicating that the catalytic MB degradation under visible light irradiation was caused by a direct photocatalytic reaction of MB on the surface of $BiVO_4$:Mo photocatalyst but not a dye-sensitization process as that observed on TiO_2 for some dye degradation.

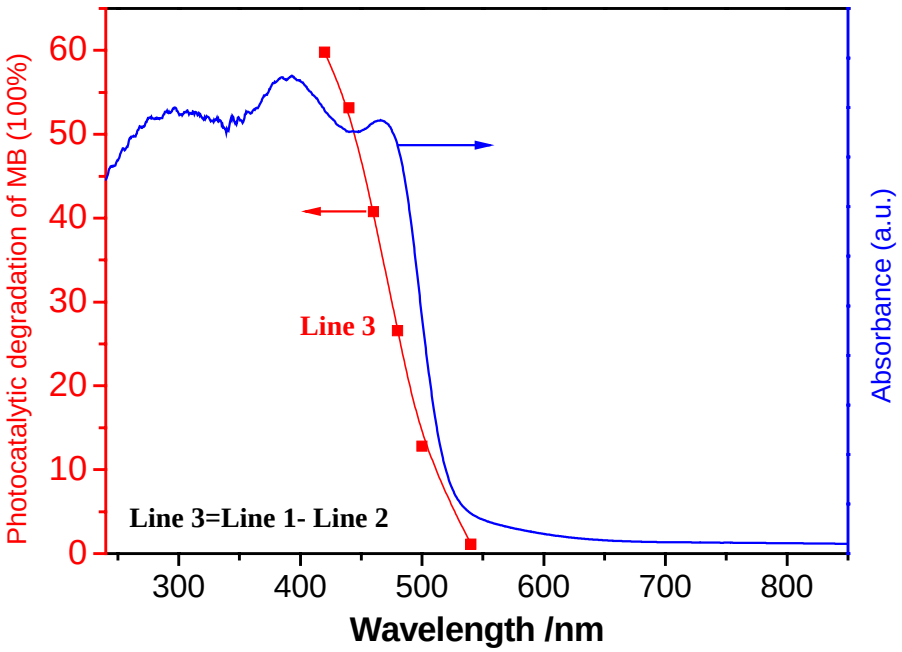

Figure S2. Wavelength dependence of MB photocatalytic degradation on the cutoff wavelength of incident light and UV-vis spectra of $BiVO_4$:Mo (2at. %). *Catalyst: 0.1g; MB 16ppm; Time: 1h; Lamp: Xe Lamp with different filter and water filter.*

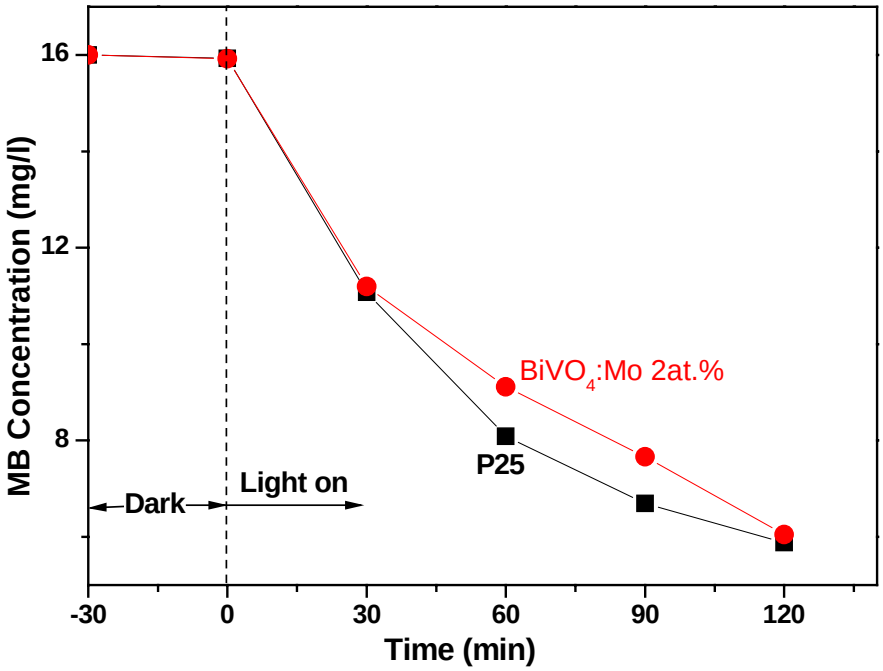

Figure S3. Photocatalytic degradation of MB over $BiVO_4$:Mo (2at. %) and P25 under a simulated solar light irradiation. *Catalyst: 0.1g; MB 16ppm; Light Source:* WXS-800-3, AM 1.5G, WACOM.