Supporting Information

Visible Light Photoelectrochemical Properties of $PbCrO_4$, Pb_2CrO_5 and Pb_5CrO_8

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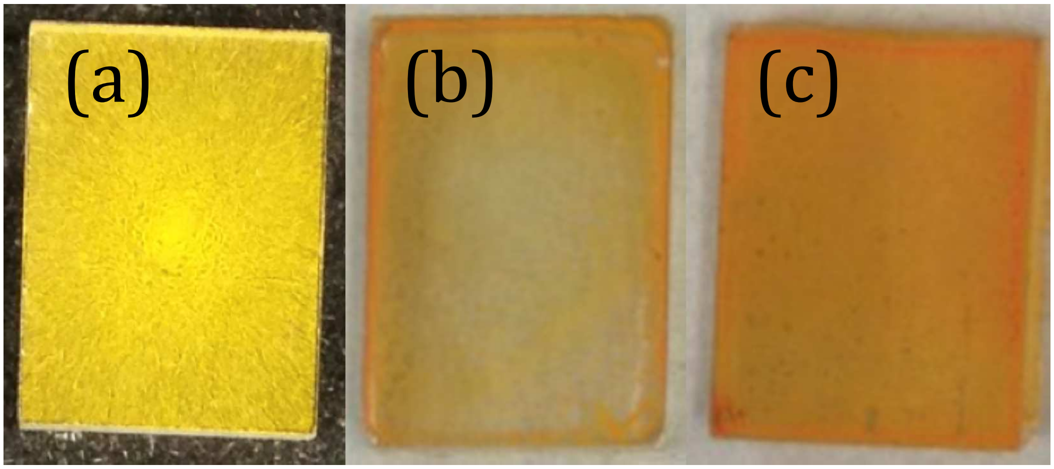

Figure S1. Picture of (a)$PbCrO_4$, (b) Pb_2CrO_5, and Pb_5CrO_8 thin film electrodes on 1 x 1.5 cm FTO glass.

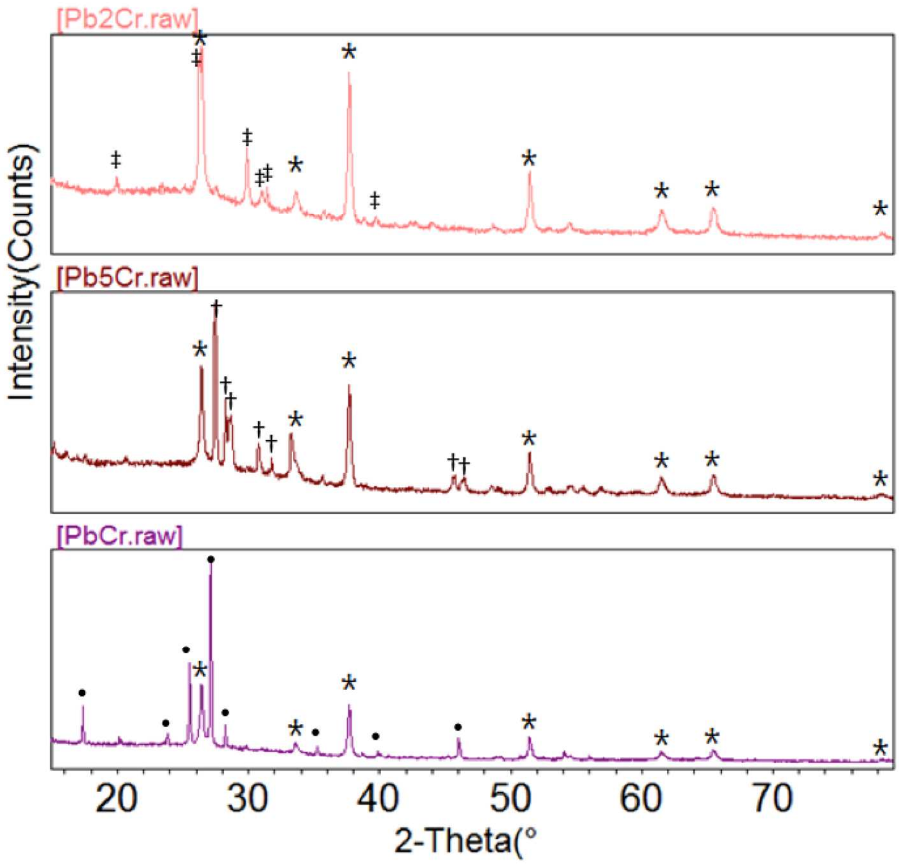

Figure S2. XRD patterns of Pb_2CrO_5 (phoenicochroite, PDF #84-0678, ‡) Pb_5CrO_8 (lead chromium oxide, PDF #47-0678, †), and $PbCrO_4$ (Chrocoite, PDF #47-2304) and patterns from the FTO substrate (*) are also indicated.

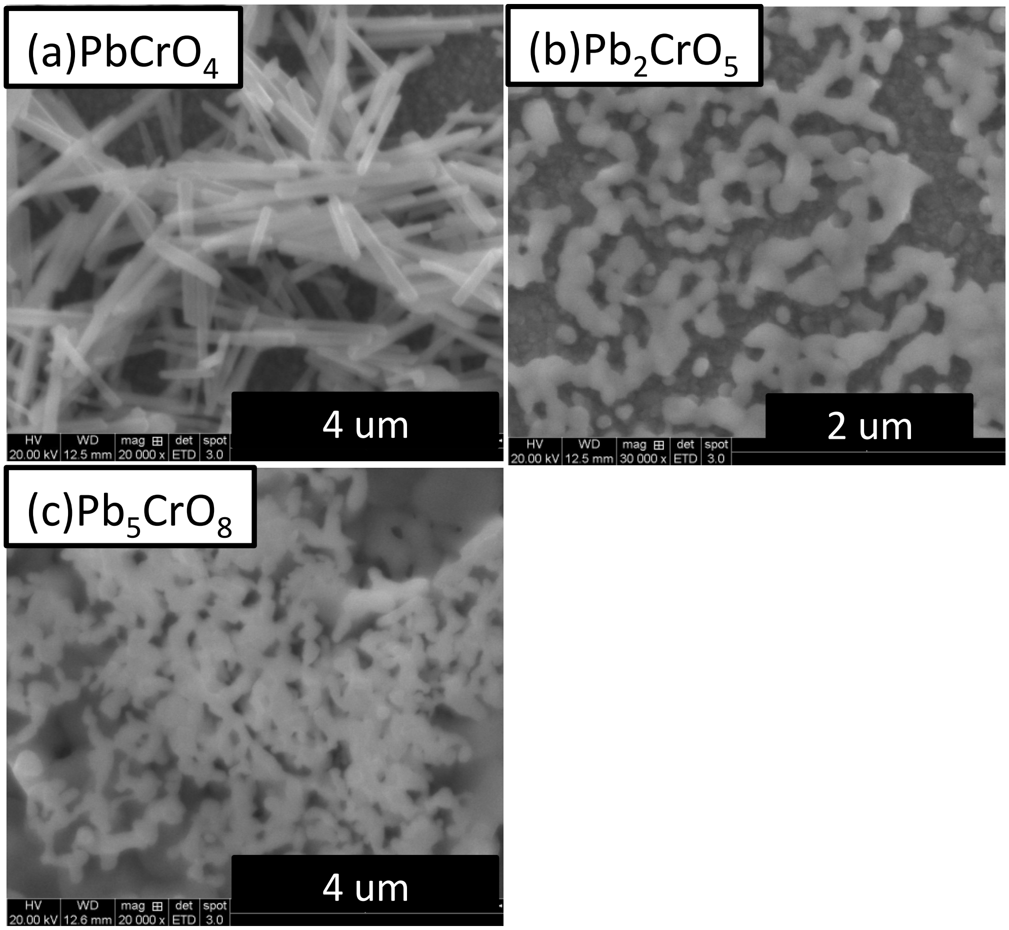

Figure S3. SEM image of (a)$PbCrO_4$, (b)Pb_2CrO_5 and (c)Pb_5CrO_8

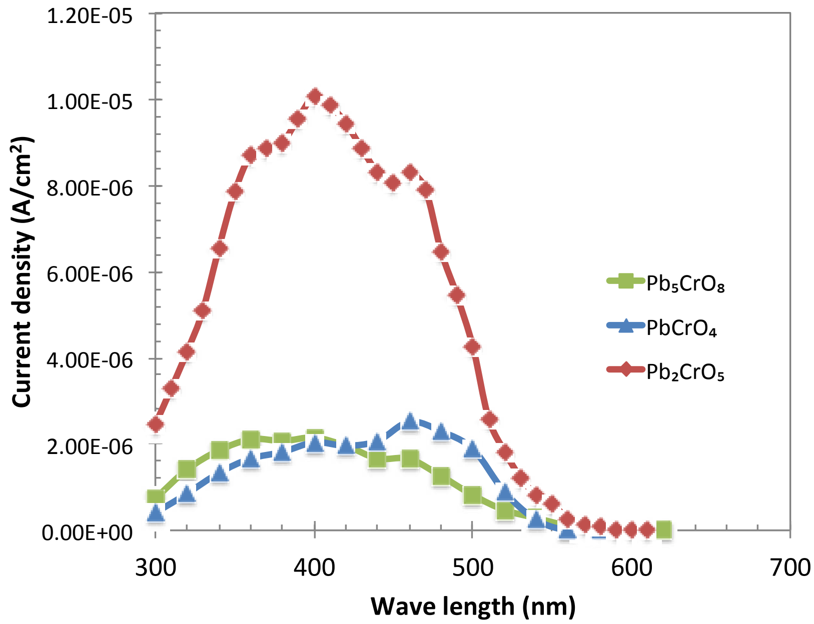

Figure S4. Action spectrum of $PbCrO_4$ (blue), Pb_2CrO_5 (Red) and Pb_5CrO_8 (green). Photocurrent of monochromic light were recorded when electrode potential was 0.3 V vs Ag/AgCl.

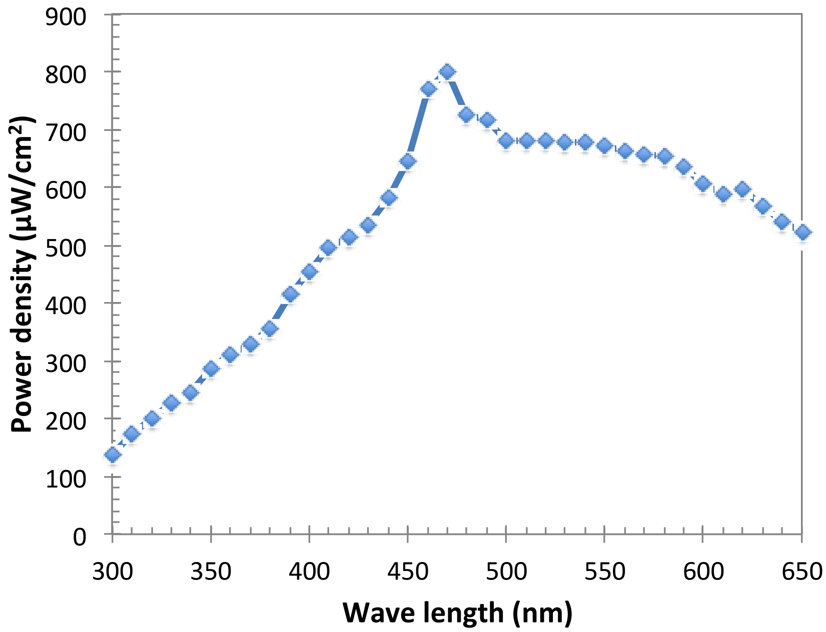

Figure S5. Power spectrum of the incident light generated from 150 mW Xe lamp measured at where a photoelectrode is placed.

Tauc plot calculation from PEC.

To get Tauc plots electrochemically, absorption coefficient (or absorbance) in Figure 3 needs to be replaced to a form of photoelectrochemical values. In the literature (35) photocurrent is directly used as absorbance while in the literature (12) IPCE (external quantum efficiency) was used.

We used absorbed photon-to-current conversion efficiency (APCE, internal quantum efficiency) for Tauc plot.

η = IPCE / Absorptance = IPCE / 1-TR = IPCE / $(1-10^{-A})$

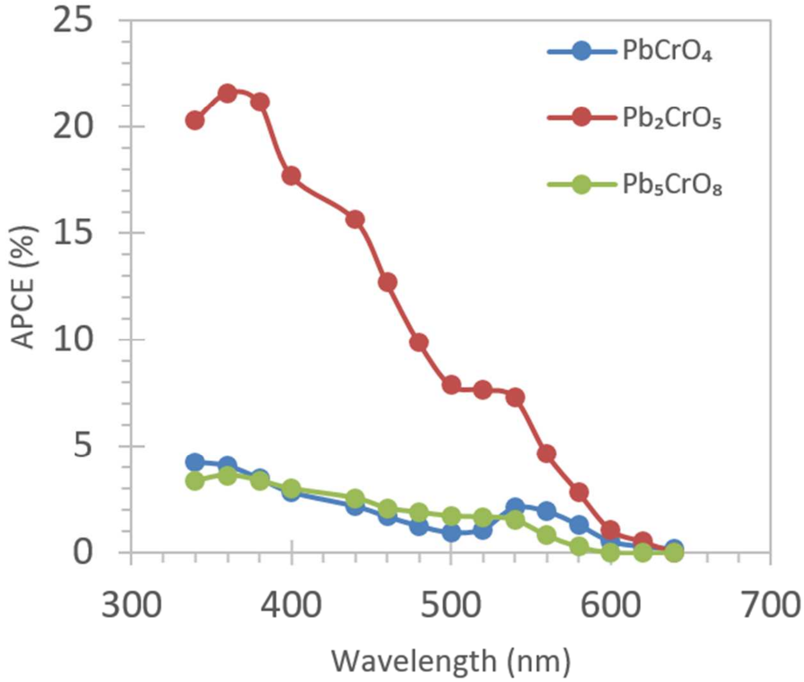

Figure S6. APCE plots of $PbCrO_4$ (blue), Pb_2CrO_5(red) and Pb_5CrO_8(green). The photocurrents at each wavelength were measured at 0.3 V vs Ag/AgCl in 0.1 M Na_2SO_4 and 0.1 M Na_2SO_3 aqueous solution.