Supporting information

Getting to the heart of the matter: control over the photolysis of PbI$_2$ through partial lead substitution

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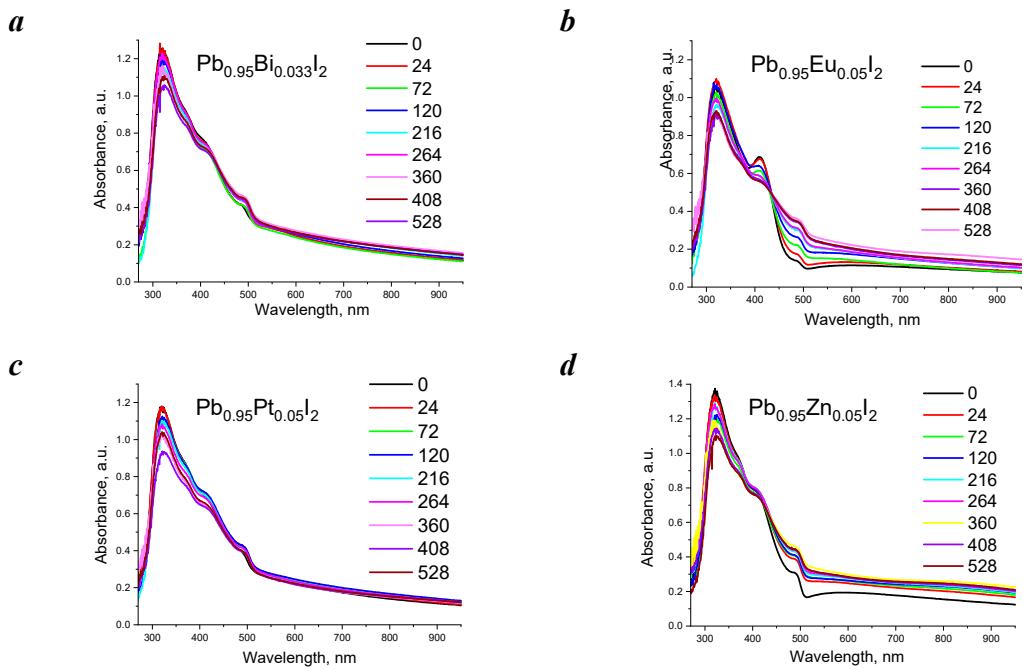
Fig. S1. The evolution of the UV-vis absorption spectra of $Pb_{0.95}M_{0.01/n}I_2$ where $M^{n+} = Bi^{3+}$ (a), Eu^{2+} (b) Pt^{2+} (c) and Zn^{2+} (d) upon white light exposure.
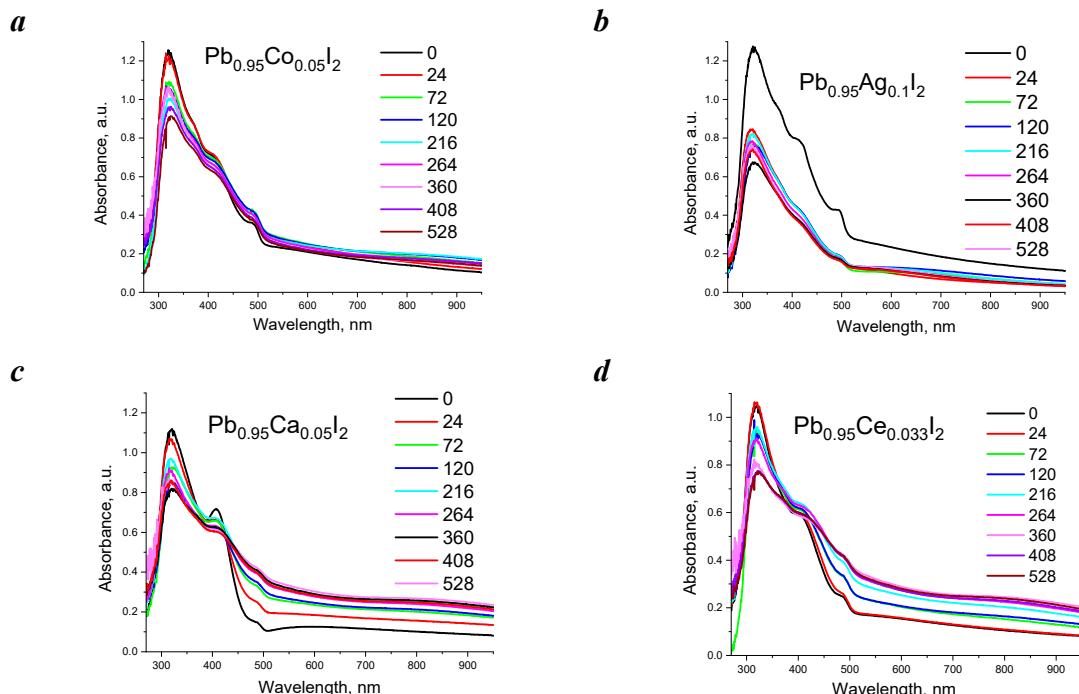
Fig. S2. The evolution of the UV-vis absorption spectra of $Pb_{0.95}M_{0.01/n}I_2$ where $M^{n+} = Co^{2+}$ (a), Ag^+ (b) Ca^{2+} (c) and Ce^{3+} (d) upon white light exposure.
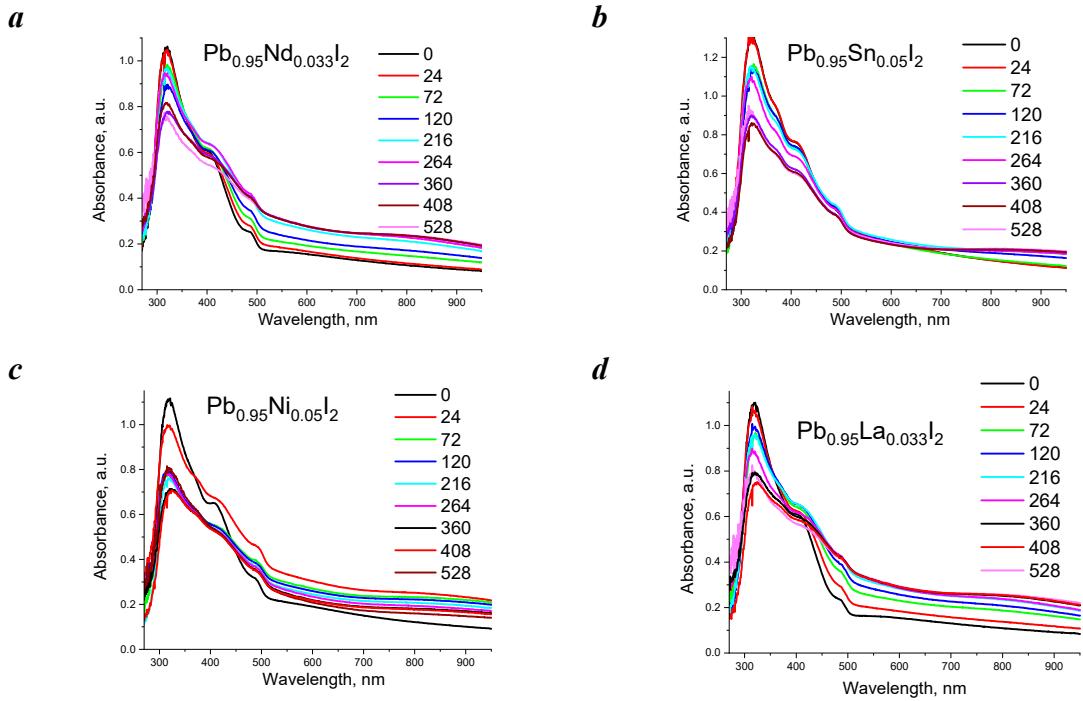
Fig. S3. The evolution of the UV-vis absorption spectra of $Pb_{0.95}M_{0.01/n}I_2$ where $M^{n+} = Nd^{3+}$ (a), Sn^{2+} (b) Ni^{2+} (c) and La^{3+} (d) upon white light exposure.
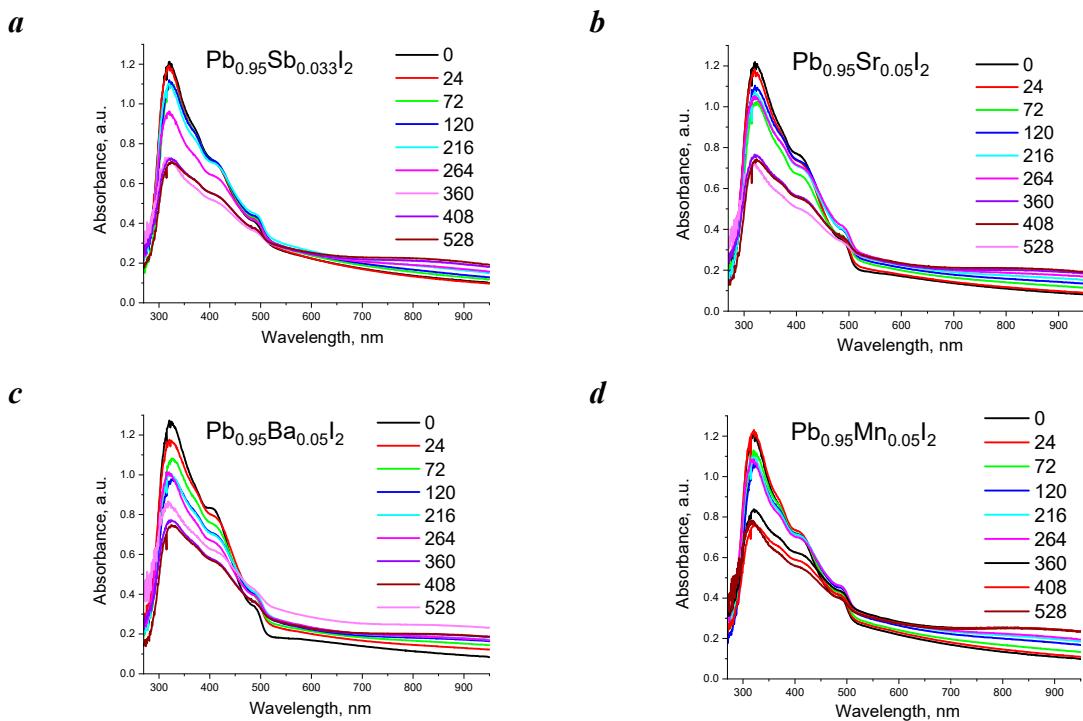
Fig. S4. The evolution of the UV-vis absorption spectra of $Pb_{0.95}M_{0.01/n}I_2$ where $M^{n+} = Sb^{3+}$ (a), Sr^{2+} (b) Ba^{2+} (c) and Mn^{2+} (d) upon white light exposure.
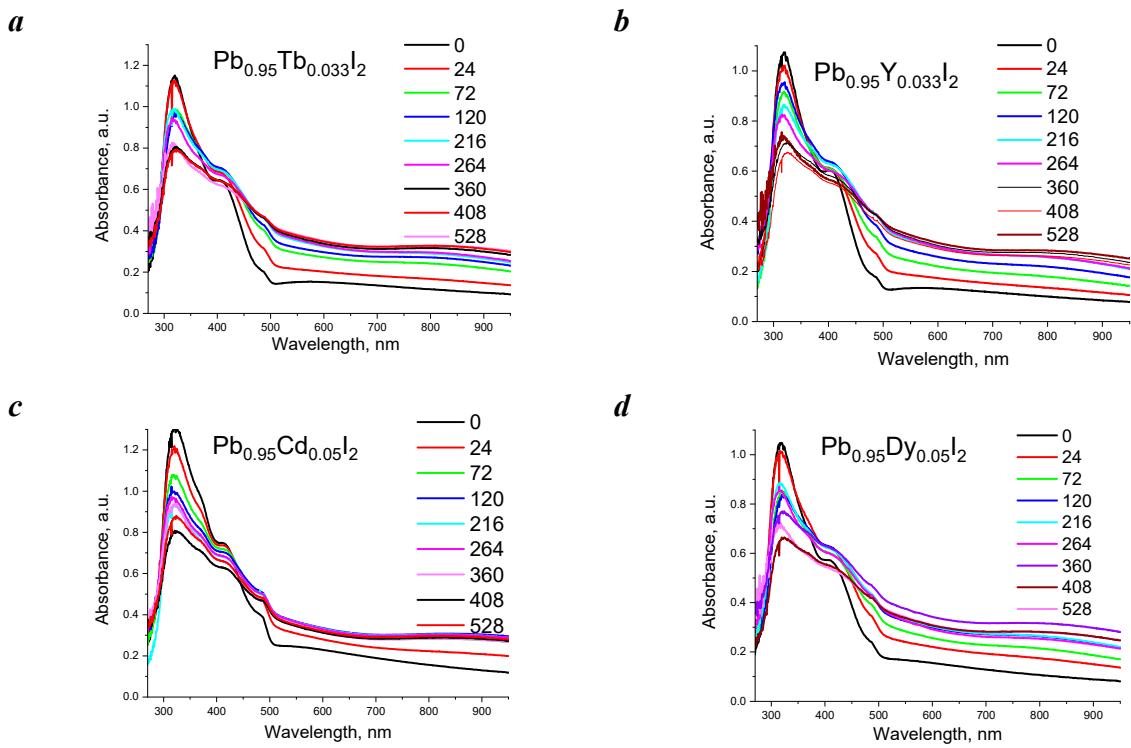
**Fig. S5.** The evolution of the UV-vis absorption spectra of $Pb_{0.95}M_{0.01/n}I_2$ where M^{n+} = Tb^{3+} (a), Y^{3+} (b) Cd^{2+} (c) and Dy^{2+} (d) upon white light exposure.
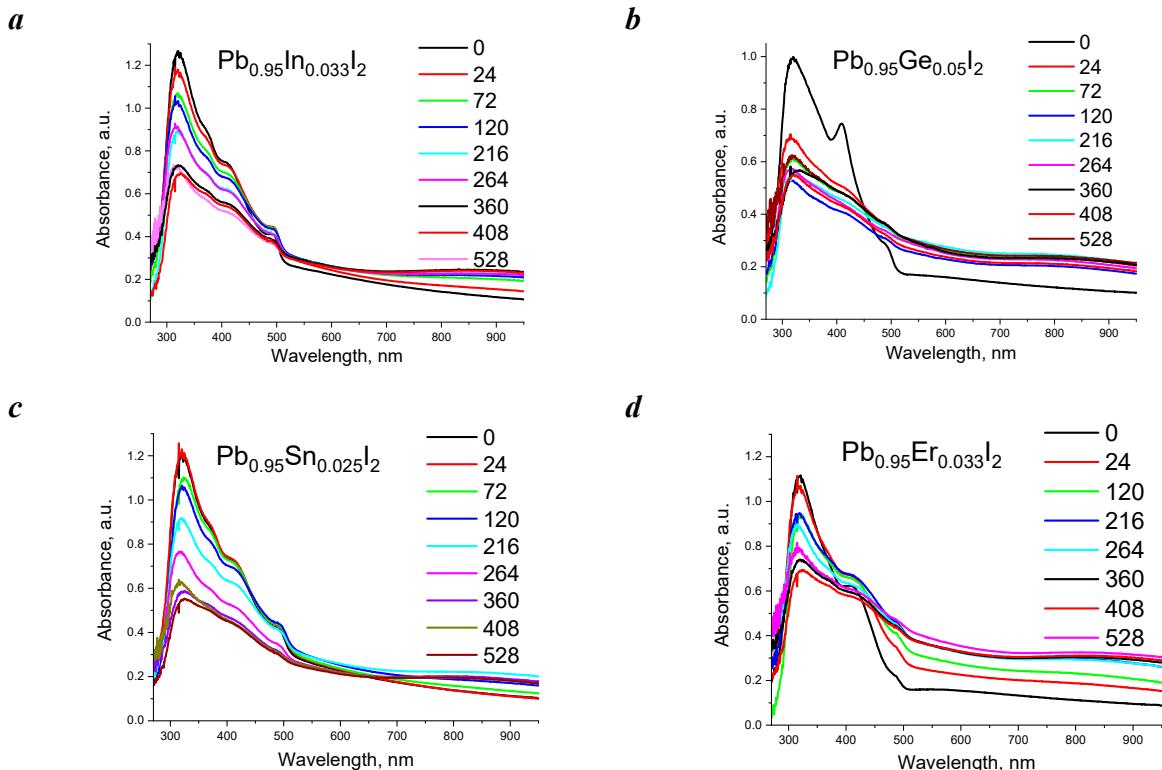
**Fig. S6.** The evolution of the UV-vis absorption spectra of $Pb_{0.95}M_{0.01/n}I_2$ where M^{n+} = In^{3+} (a), Ge^{2+} (b) Sn^{4+} (c) and Er^{3+} (d) upon white light exposure.
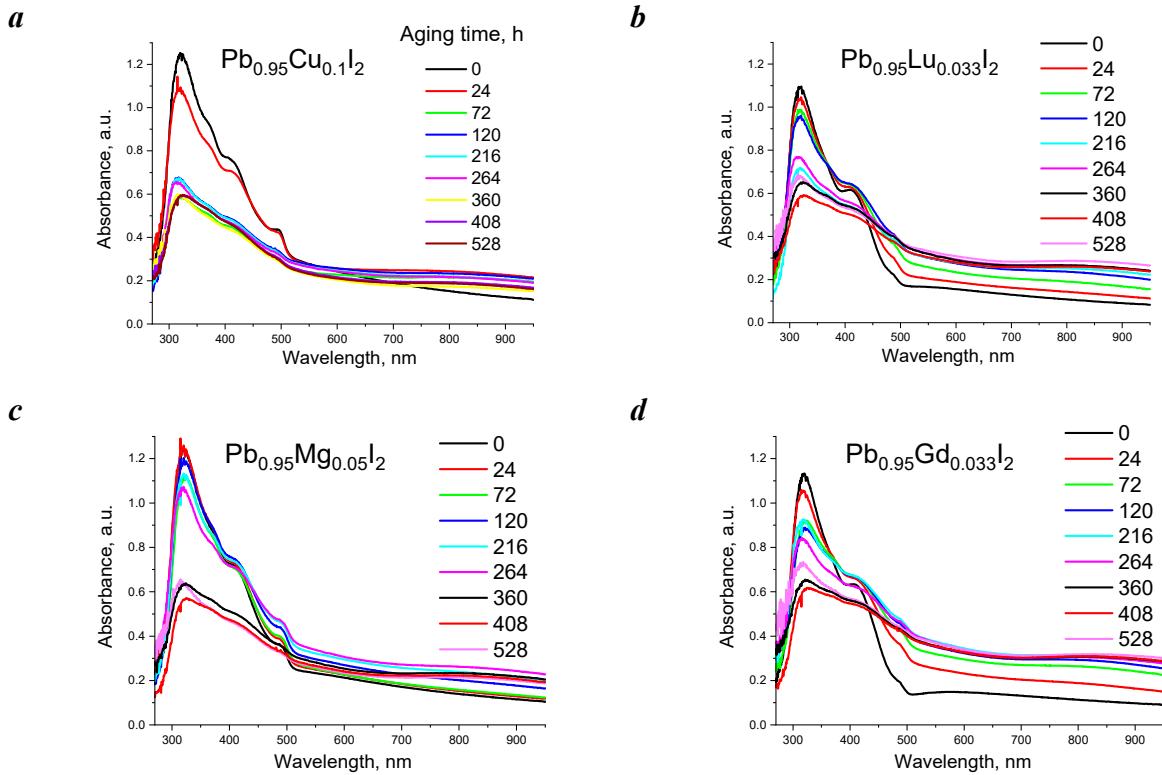
**Fig. S7.** The evolution of the UV-vis absorption spectra of $Pb_{0.95}M_{0.01/n}I_2$ where $M^{n+} = Cu^+$ (a), Lu^{3+} (b) Mg^{2+} (c) and Gd^{3+} (d) upon white light exposure.
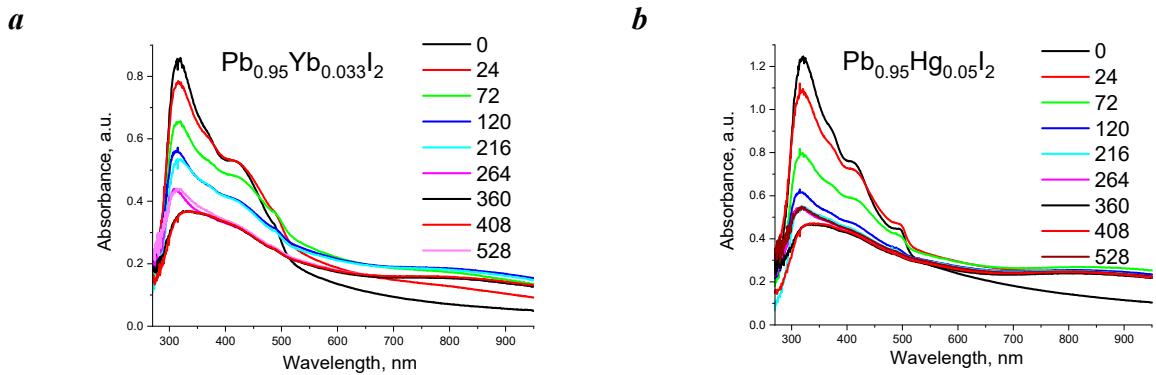

Fig. S8. The evolution of the UV-vis absorption spectra of $Pb_{0.95}M_{0.01/n}I_2$ where $M^{n+} = Yb^{3+}$ (a), Hg^{2+} (b) upon white light exposure.
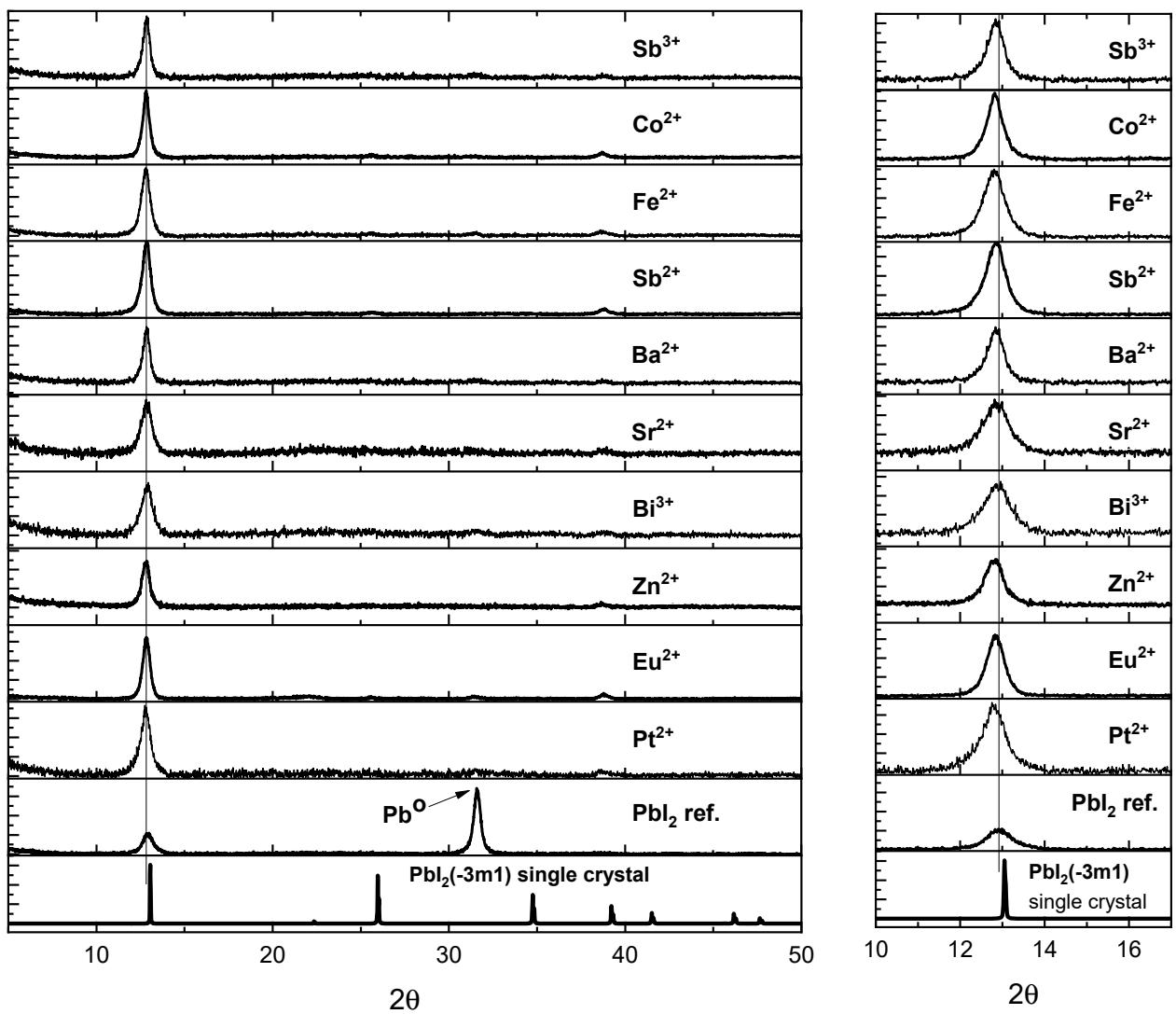
**Fig. S9.** The evolution of the XRD patterns of the $Pb_{0.95}M_{0.01/n}I_2$ films after 400 h of light exposure.
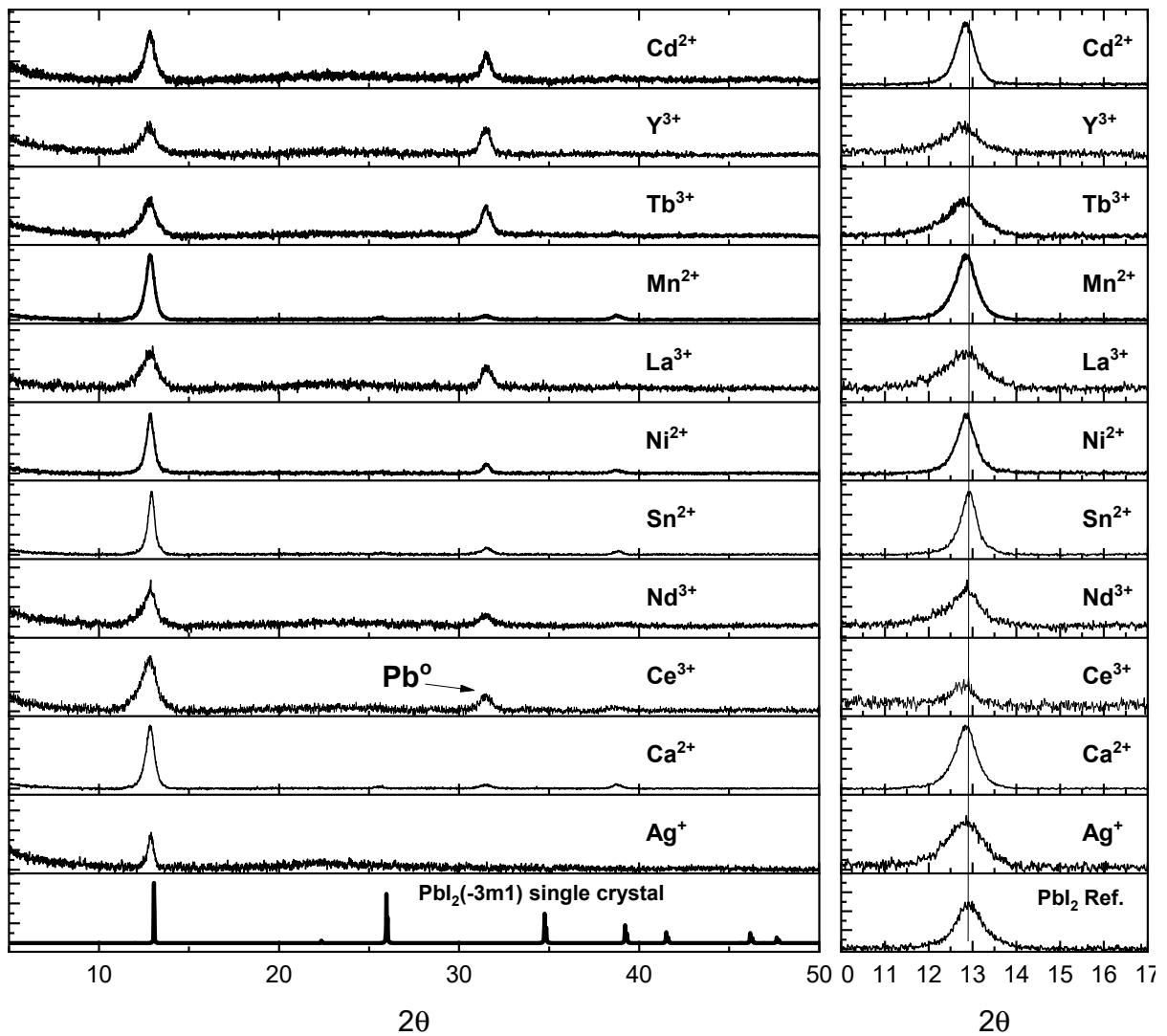
Fig. S10. The evolution of the XRD patterns of the $Pb_{0.95}M_{0.01/n}I_2$ films after 400 h of light exposure.
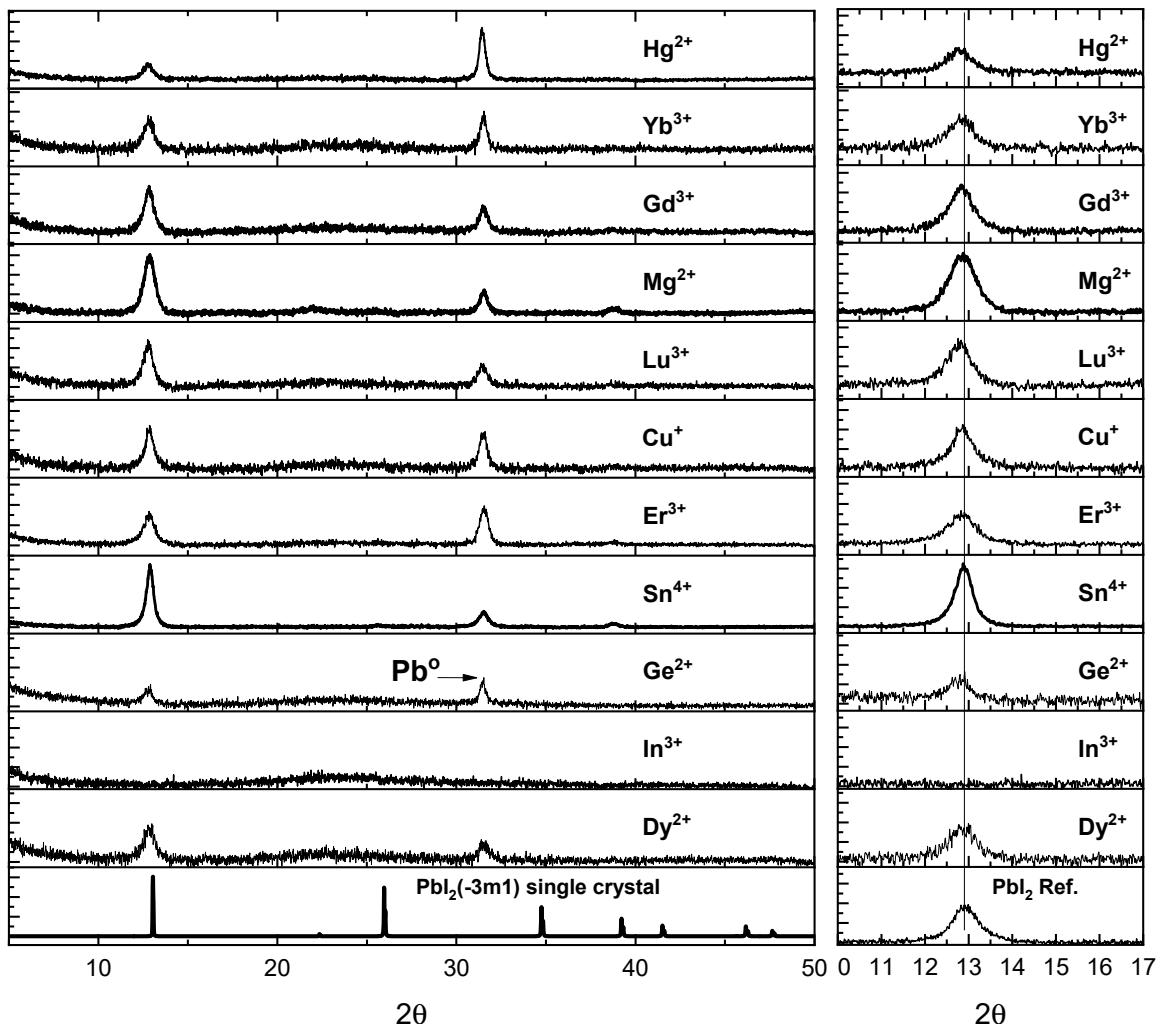
Fig. S11. The evolution of the XRD patterns of the $Pb_{0.95}M_{0.01/n}I_2$ films after 400 h of light exposure.
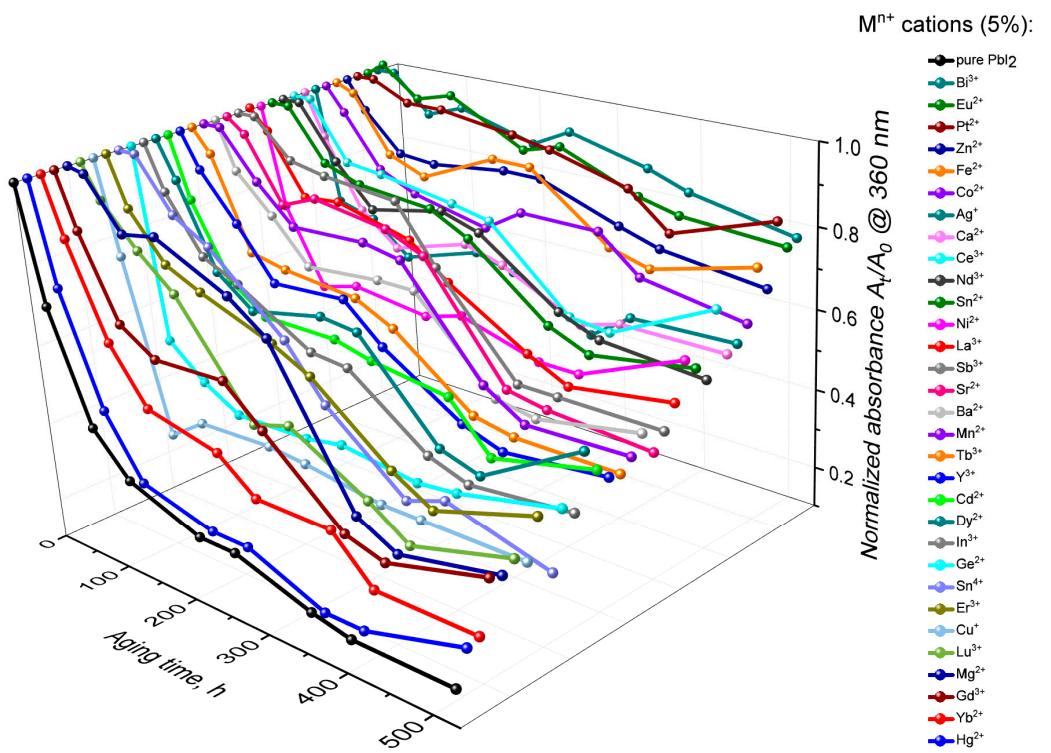
Fig. S12. The photochemical aging dynamics of the $Pb_{0.95}M_{0.1/n}I_2$ films represented by the evolution of the normalized film absorbance as a function of the aging time.