

# Combination of Metal Oxide and Polytriarylamine: a Design Principle to Improve the Stability of Perovskite Solar Cells

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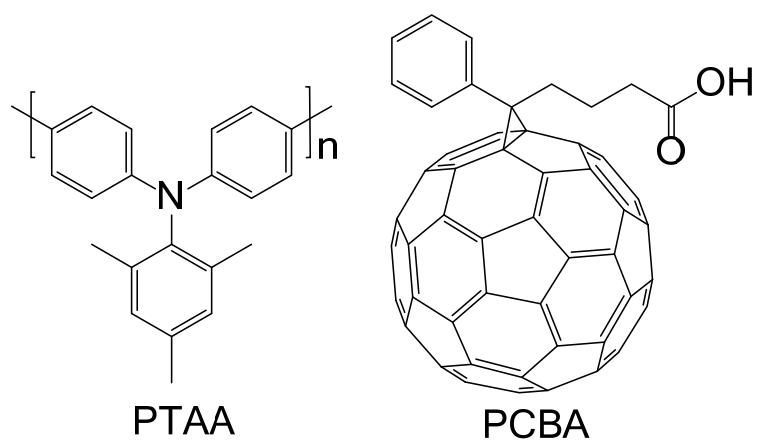
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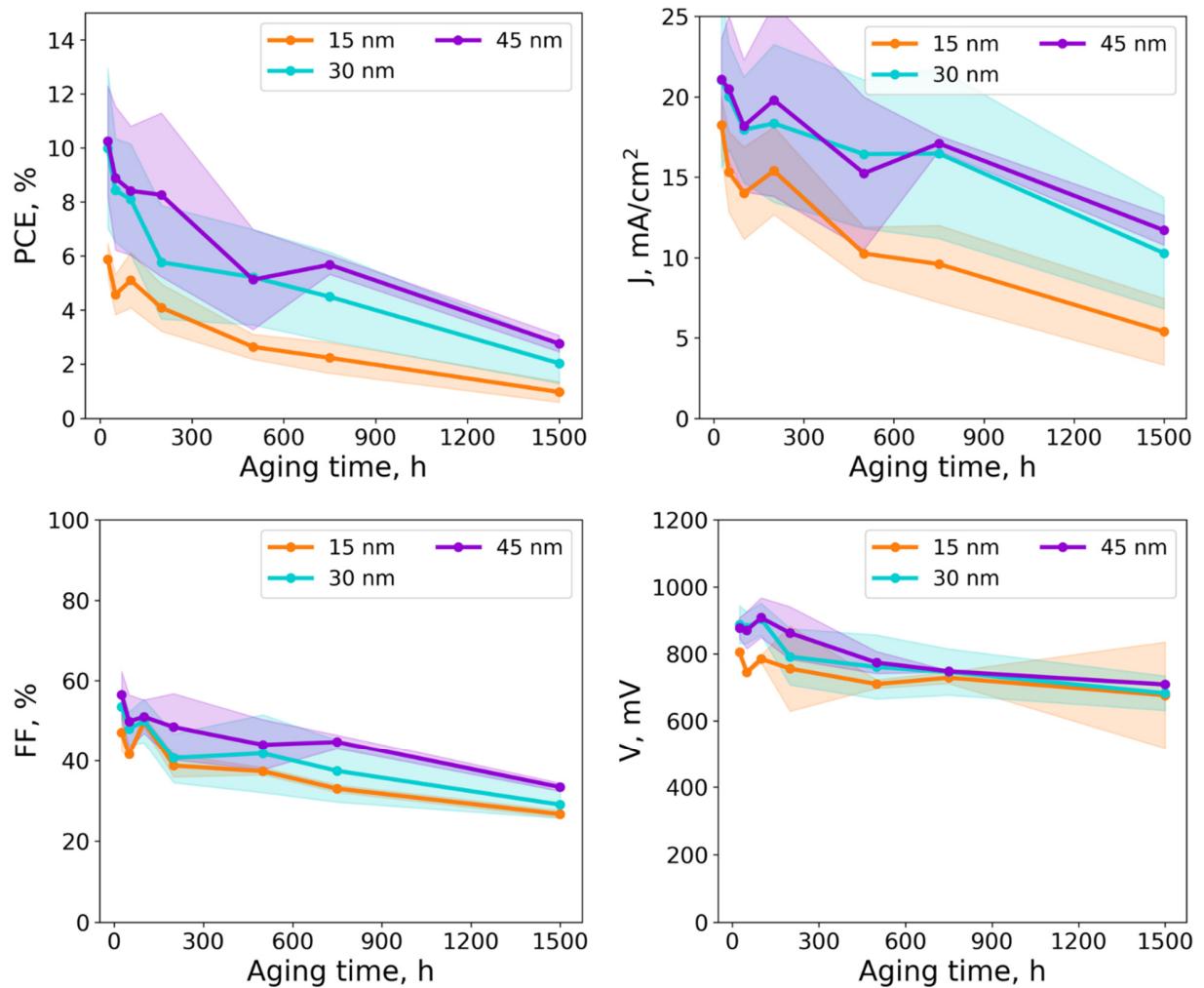
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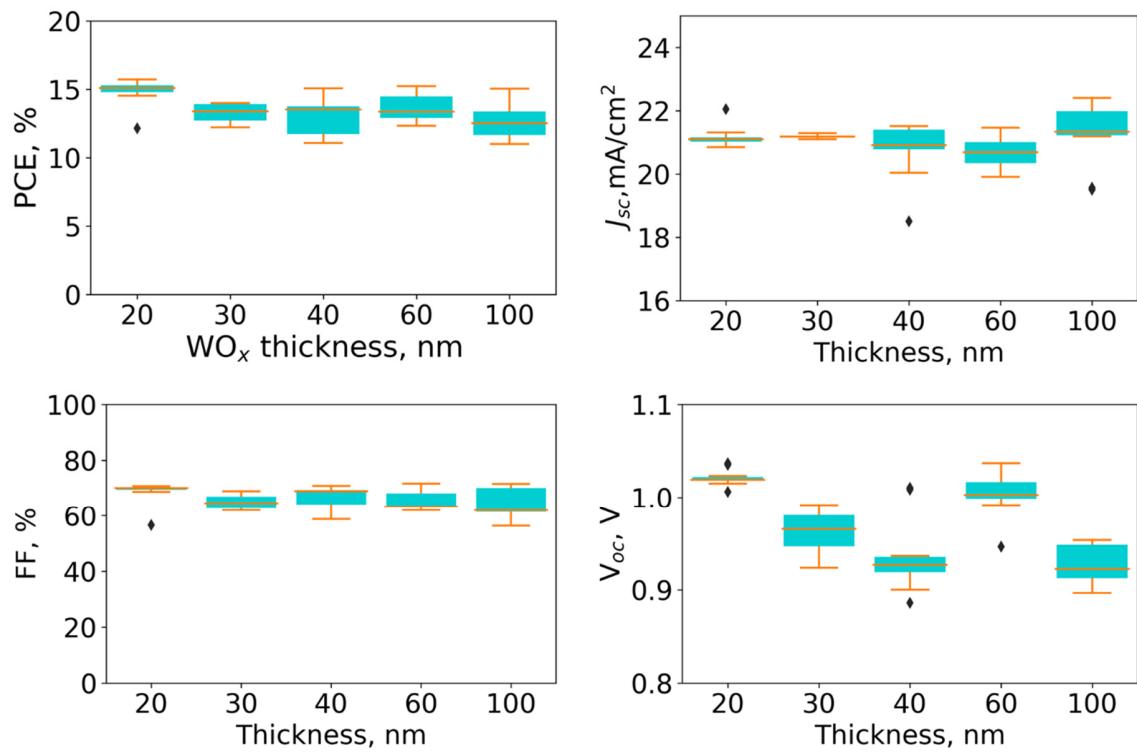
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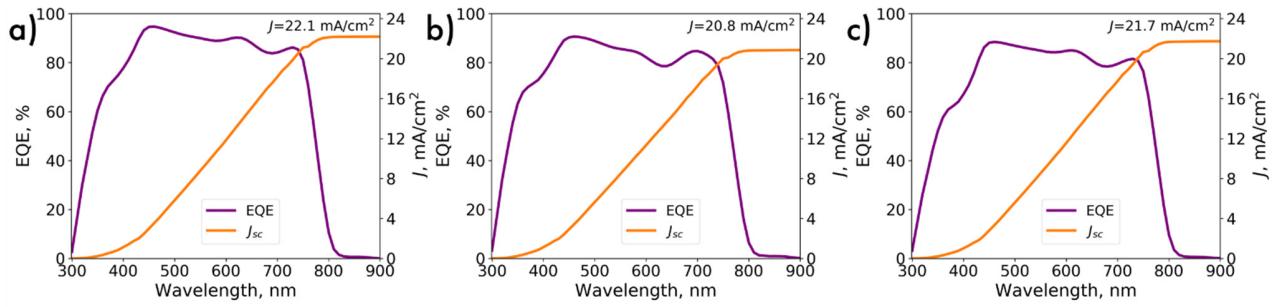
**Figure S1.** Structures of PTAA and PCBA



**Figure S2.** Stability of devices with 15, 30, and 45 nm of VO<sub>x</sub> under continuous light soaking 70 mW/cm<sup>2</sup> and temperature 55±3°C. The device configuration is ITO/ZnO/CsFAPbI<sub>3</sub>/PTAA/Al



**Figure S3.** Characteristics of perovskite solar cells incorporating various thicknesses of  $\text{WO}_x$



**Figure S4.** EQE of perovskite solar cells with configuration ITO/SnO<sub>2</sub>/PCBA/CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub>/PTAA/MOx/Ag, where MOx is MoO<sub>x</sub> 10 nm (a), VO<sub>x</sub> 30 nm (b); WO<sub>x</sub> 20 nm (c).