

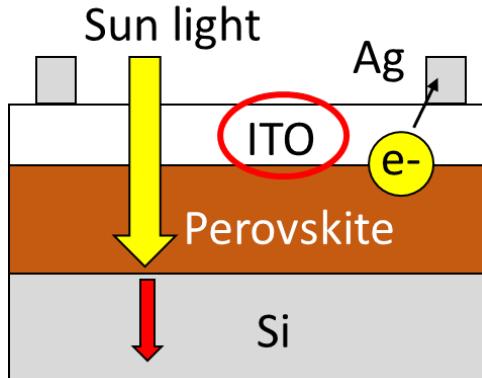
Vacuum spray deposition of ITO nanoparticle buffer layer for suppression of sputtering damage on perovskite/Si tandem solar cells

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Background

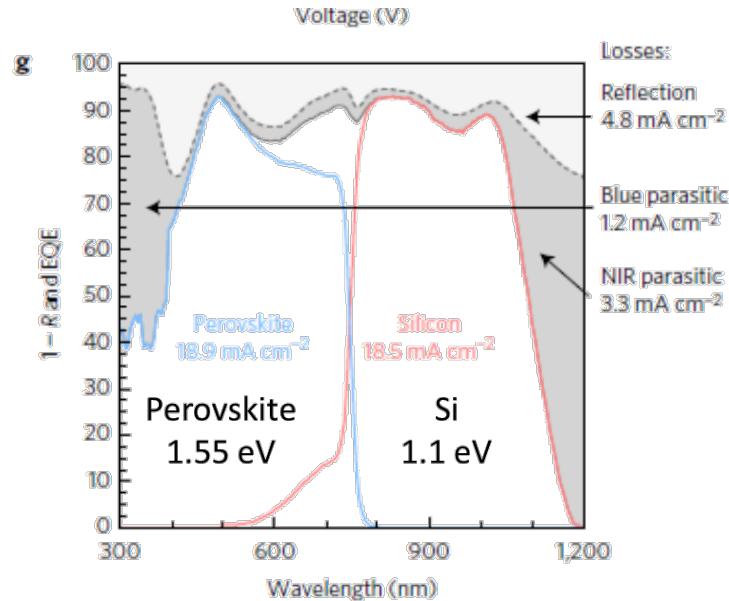
Si and perovskite Tandem solar cells



- $\text{CH}_3\text{NH}_3\text{PbI}_3$
- Bandgap: $\sim 1.55 \text{ eV}$
- Including organic

The ITO layer is deposited by **sputtering**
 \rightarrow Damage on the perovskite solar cells

Problem!!

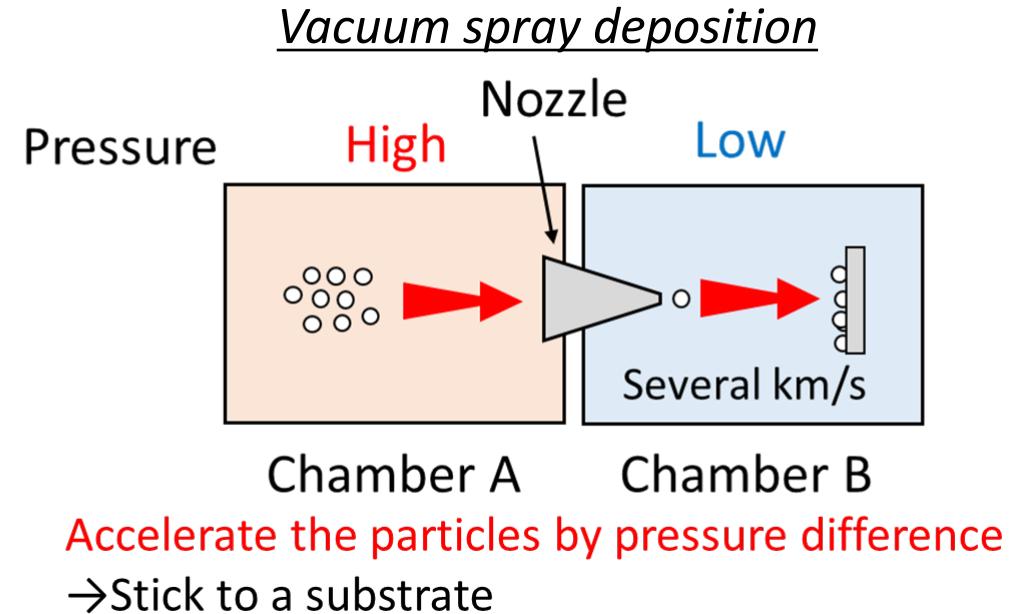
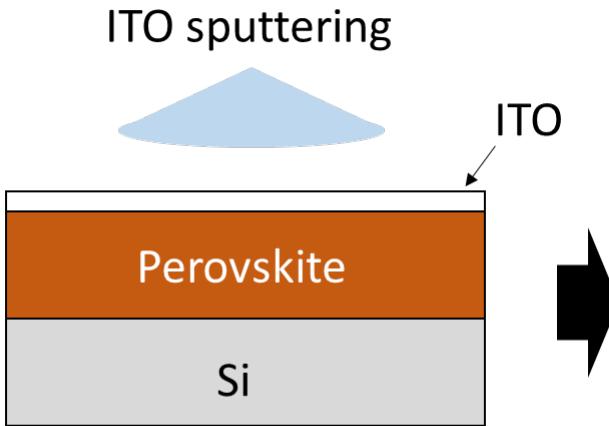


K. A. Bush et al., Nature energy, 2 (2017).

Aim

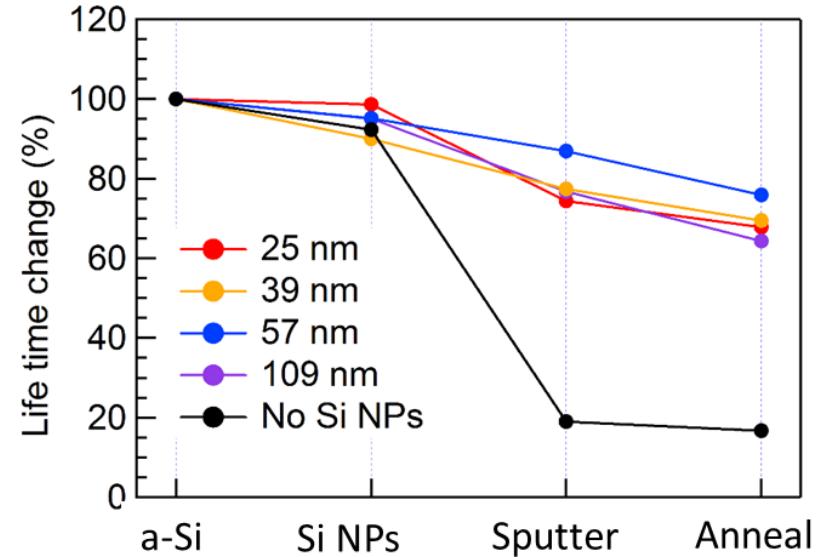
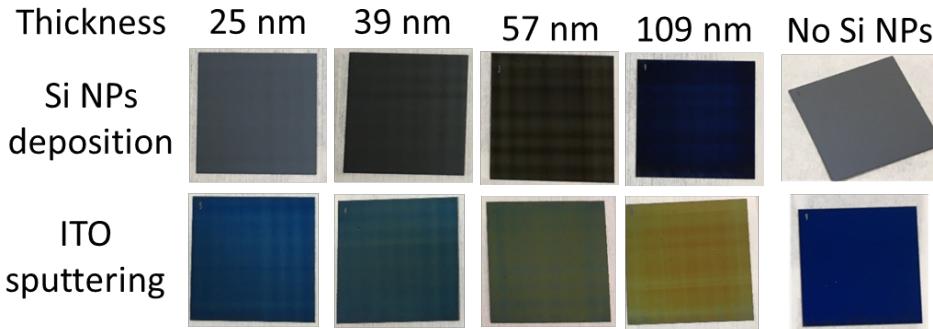
To suppress the sputtering damage on the perovskite solar cells

How do I solve the problem?



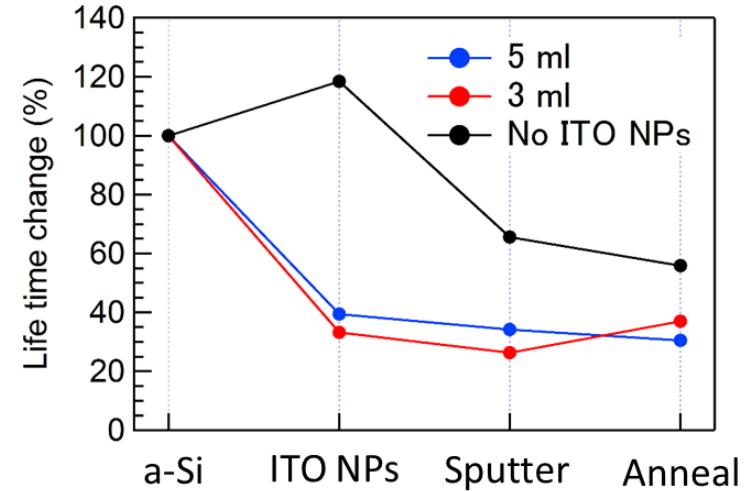
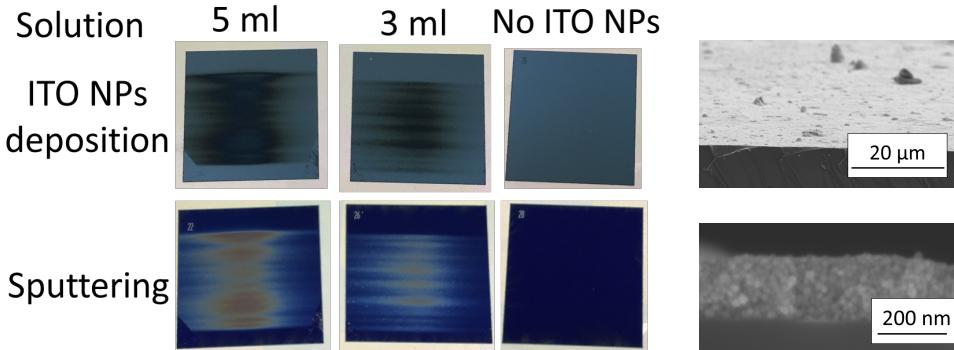
Suppress the damage by
depositing thin ITO film

Si nanoparticle buffer layer



- The color of Si wafer changed with increasing thickness of Si NPs layer
- The Si NPs layer suppressed the sputtering damage even for thickness of 25 nm

ITO nanoparticle buffer layer



- The ITO NPs film of 200 nm was obtained.
- The life time decreased after ITO NPs deposition but essentially unchanged after sputtering



The nanoparticle buffer layer is effective to suppress the sputtering damage.



Thank you for kind attention.