

Supporting Information

Interlayer engineering via alkali hypophosphate for efficient and air-stable perovskite solar cells

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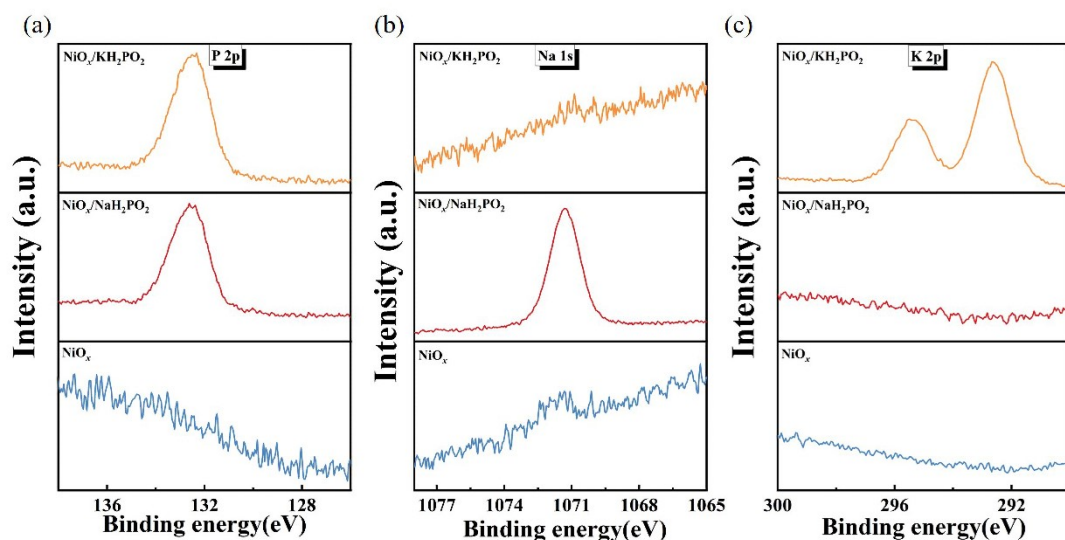


Figure.S1: High resolution XPS spectra of (a) P, (b) Na and (c) K elements in NiO_x with and without MH_2PO_2 modification

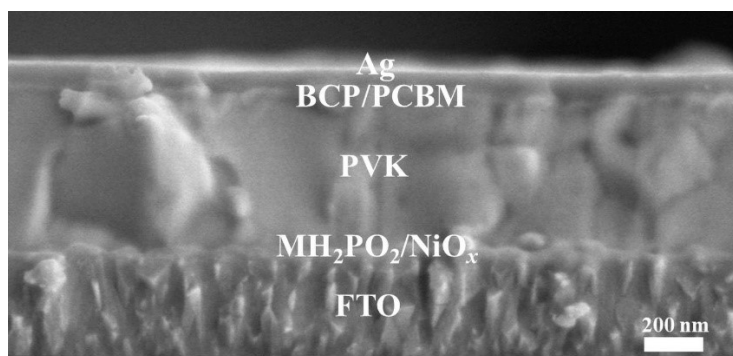


Figure.S2: The cross-sectional SEM images of the perovskite films

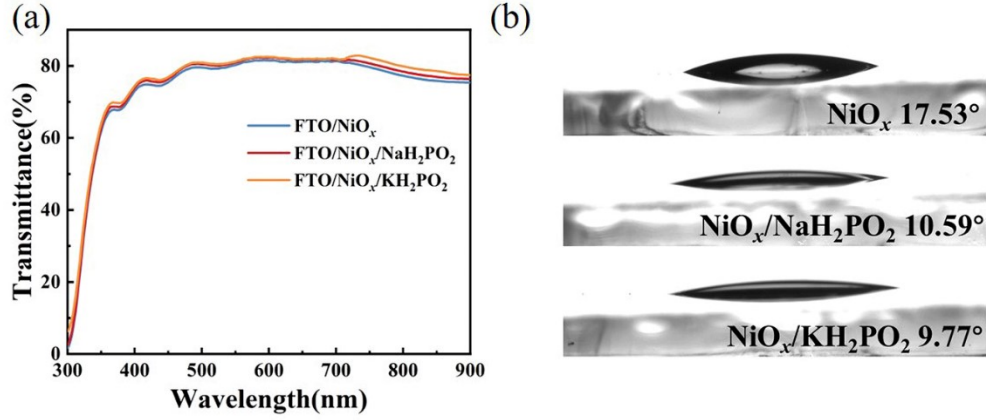


Figure.S3: (a) The UV-vis transmittance spectra of the NiO_x films with and without MH₂PO₂ (b) pictures of contact angle measurements of NiO_x films with and without MH₂PO₂ modification with water as the liquid.

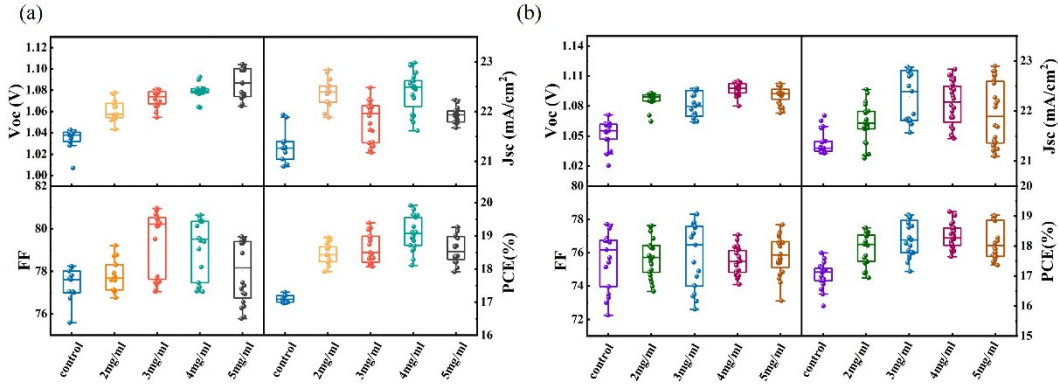


Figure.S4: Photovoltaic parameter statistics for the (a) NaH₂PO₂-modified and (b) KH₂PO₂-modified PSCs extracted by the J–V characteristics.

Table S1: The fitted lifetime values from the curves of the TRPL measurements.

Samples	B ₁ (%)	τ ₁ (ns)	B ₂ (%)	τ ₂ (ns)	τ(ns)
FTO/NiO _x /PVK	1.19	23.21	98.81	661.08	660.81
FTO/NiO _x /NaH ₂ PO ₂ /PVK	2.38	55.05	97.62	864.32	863.07
FTO/NiO _x /KH ₂ PO ₂ /PVK	1.46	45.15	98.54	985.43	984.79

Table S2: The EIS fitting parameters of control and MH₂PO₂-passivated devices derived from Figure. 6d.

Device	R _s (Ω)	R _{ct} (Ω)
Control	87.98	3476
PSCs with NaH ₂ PO ₂	34.72	9033
PSCs with KH ₂ PO ₂	57.8	8187