Supporting Information for:

Simulation study of reducing reflection losses in all-perovskite tandem solar cells through dual serrated structure

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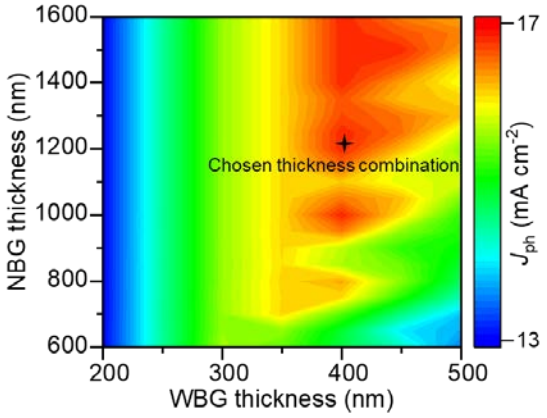

Fig. S1 J_{ph} of all-perovskite TSCs as a function of the thickness of WBG and NBG perovskite layers.

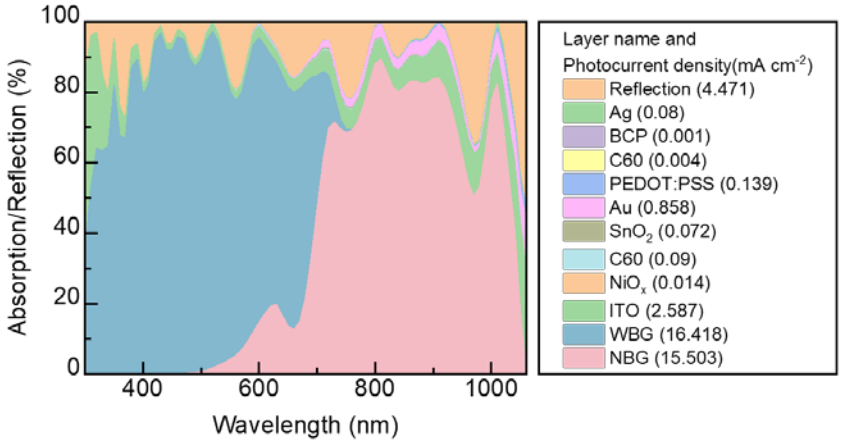

Fig. S2 Optical analysis of the all-perovskite TSCs of each layer and reflection loss.

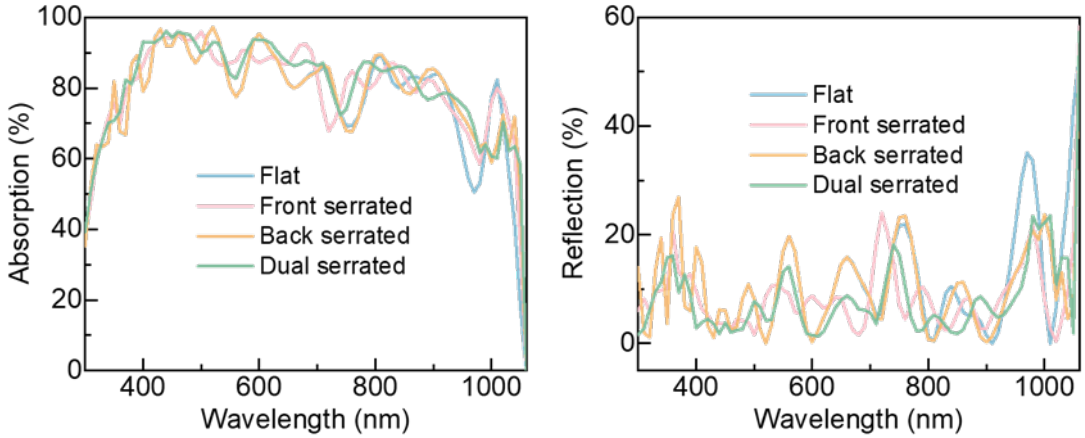

Fig. S3 a Absorption of the all-perovskite TSCs with four optimized structures. **b** Reflection of the all-perovskite TSCs with four optimized structures.

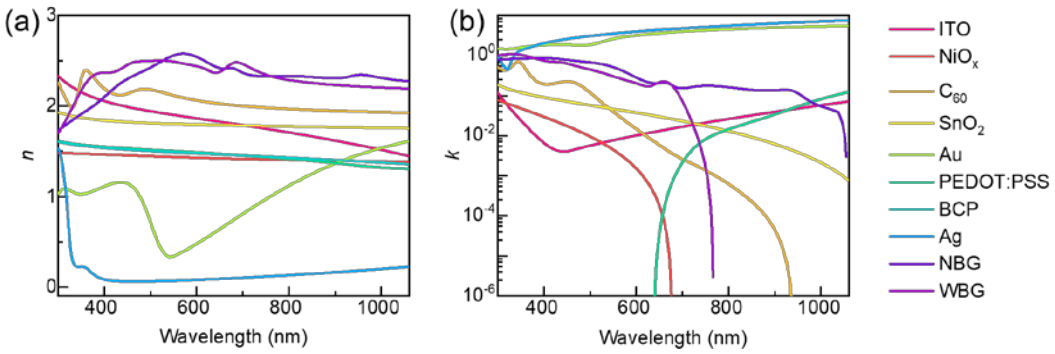

Fig. S4 a refractive index $n(\lambda)$ of each layer in the all-perovskite TSCs. **b** refractive index $k(\lambda)$ of each layer in the all-perovskite TSCs.

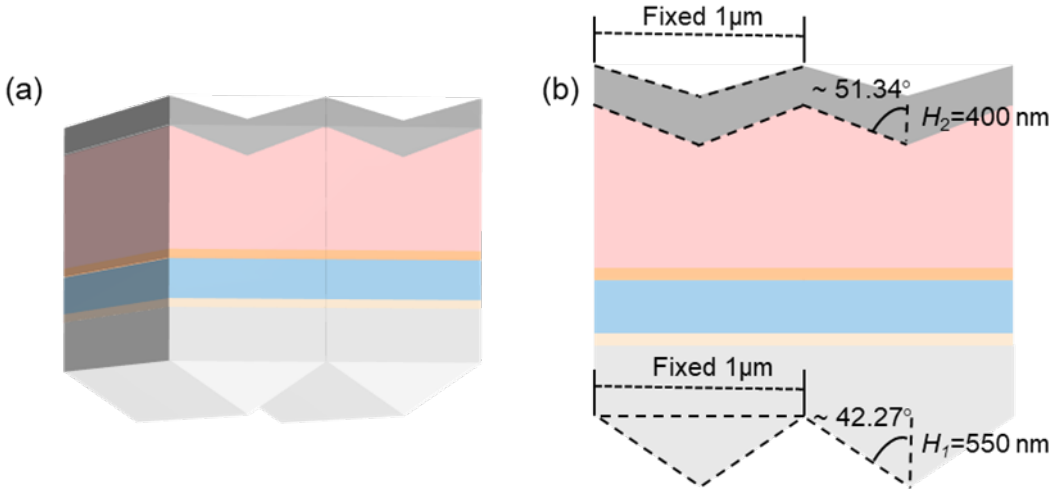

Fig. S5 a 3D schematic diagram of periodic dual serrated structure in the all-perovskite TSCs. **b** Widths, heights and angles of the optimized dual serrated structure.

Layer name	Thickness (nm)
Glass	1100000
ITO	180
NiO_X	7
1.8eV WBG PVSK $(DMA_{0.1}Cs_{0.4}FA_{0.5}Pb(I_{0.75}Br_{0.25})_{2.85}Cl_{0.15})$	400
C_{60}	20
SnO_2	15
Au	1
PEDOT:PSS	18
1.25eV NBG PVSK ($Cs_{0.1}FA_{0.6}MA_{0.3}Sn_{0.5}Pb_{0.5}I_3$)	1200
C_{60}	20
BCP	5
Ag	150

Table S1 The materials and corresponding thicknesses used in the flat structure of the all-perovskite tandem solar cells.

Year	Photocurrent density of WBG subcell (mA cm^{-2})	Photocurrent density of NBG subcell (mA cm^{-2})	Ref.
2024	16.60	16.60	[1]
2025	16.22	16.21	[2]
2025	16.34	16.53	[3]
2025	16.23	15.96	[4]
2025	16.01	15.96	[5]
2025	**16.42**	**16.50**	**This work**

Table S2 The integrated photocurrent density of subcells from EQE measurements in recent years.

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