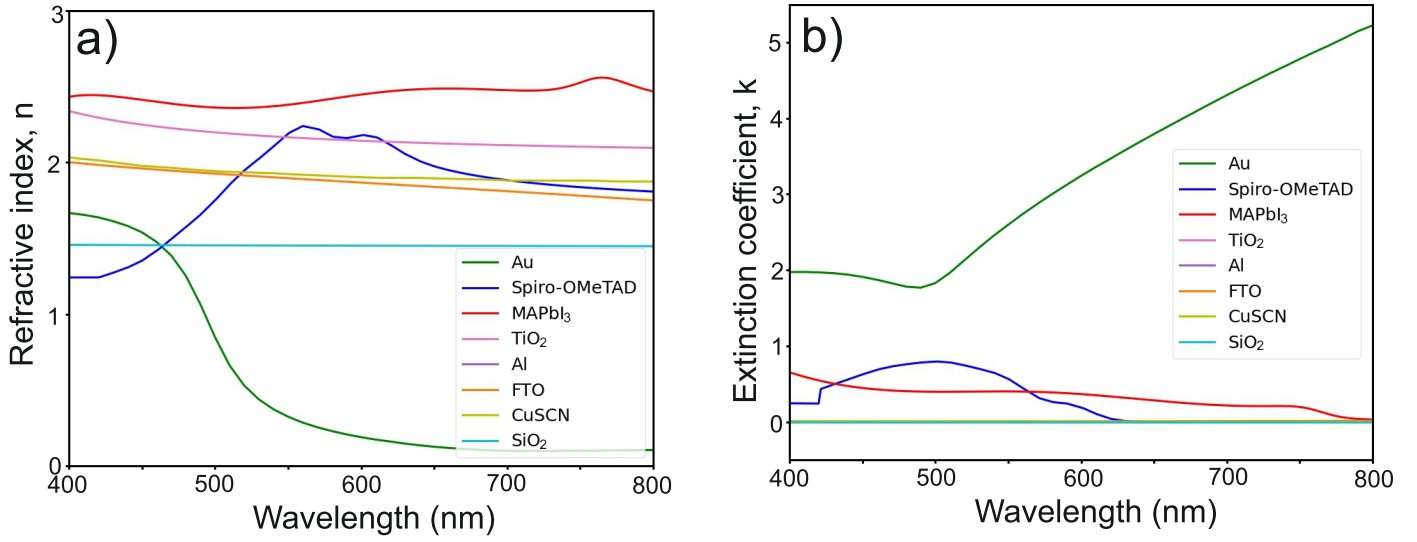
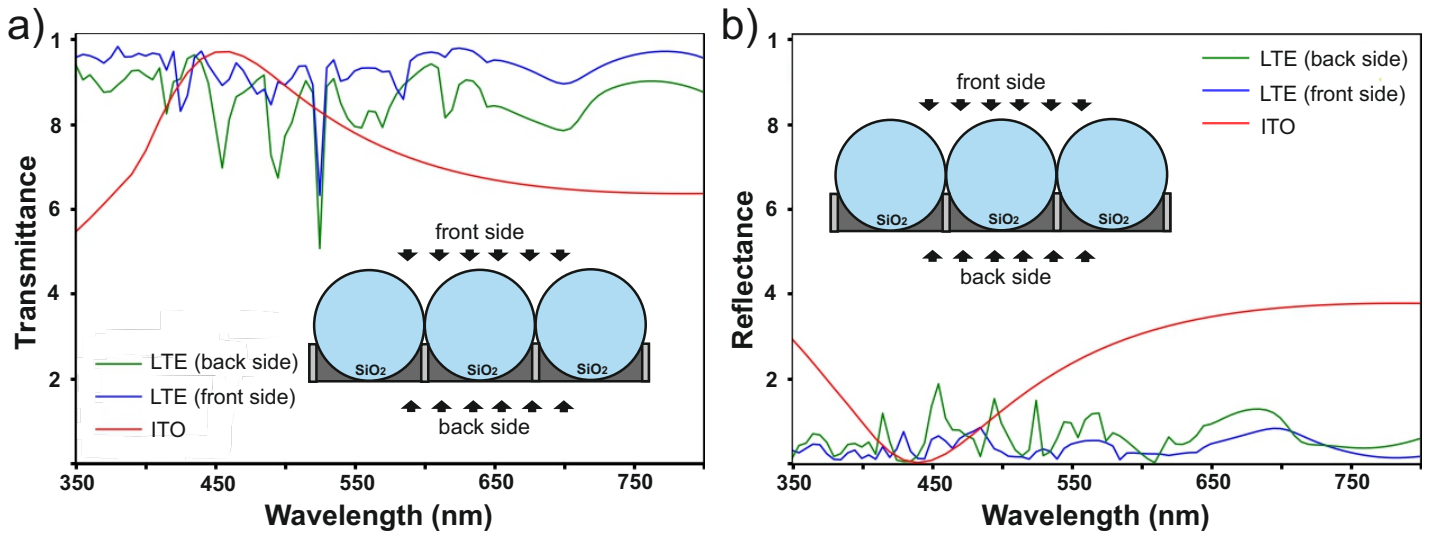


# Supplementary Materials: Light-Trapping Electrode for the Efficiency Enhancement of Bifacial Perovskite Solar Cells

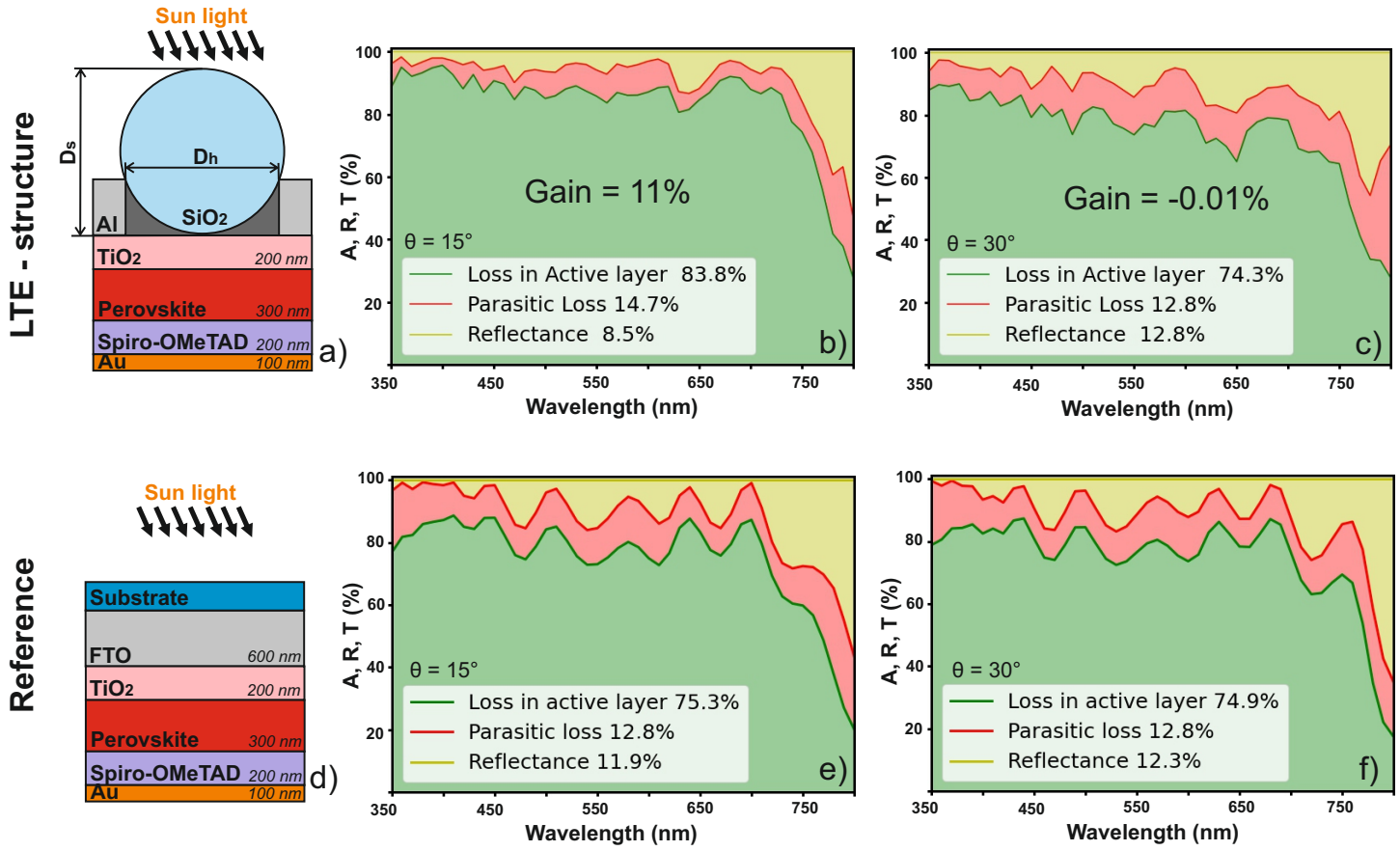
Anna A. Obraztsova<sup>1,\*,†</sup>, Daniele Baretin<sup>2,\*,†</sup>, Aleksandra D. Furasova<sup>1</sup>, Pavel M. Voroshilov<sup>1</sup>, Matthias Auf der Maur<sup>3</sup>, Andrea Orsini<sup>2</sup> and Sergey V. Makarov<sup>1,4,5</sup>



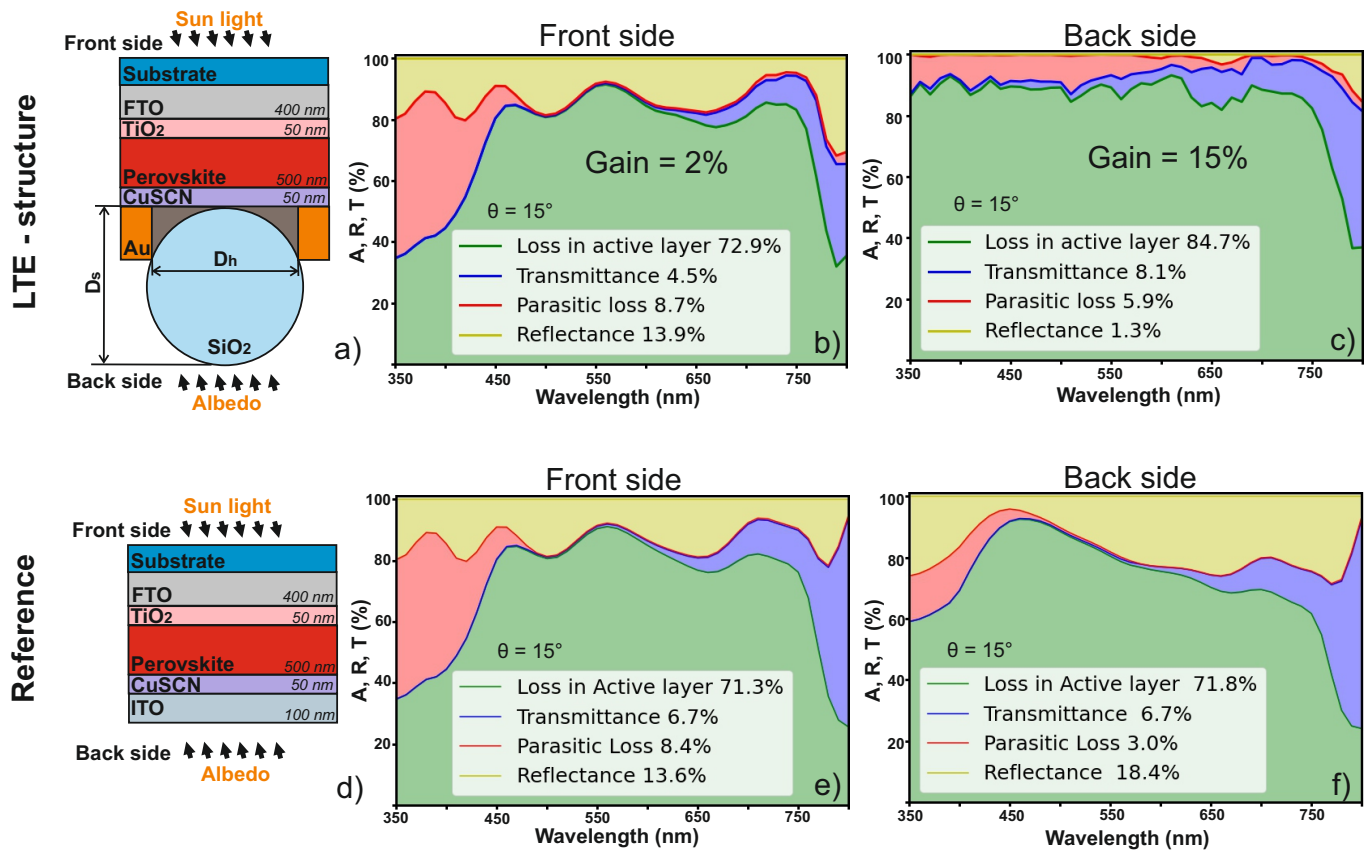
**Figure S1.** The complex refractive index of each materials (a) refractive indexes, (b) extinction coefficients.



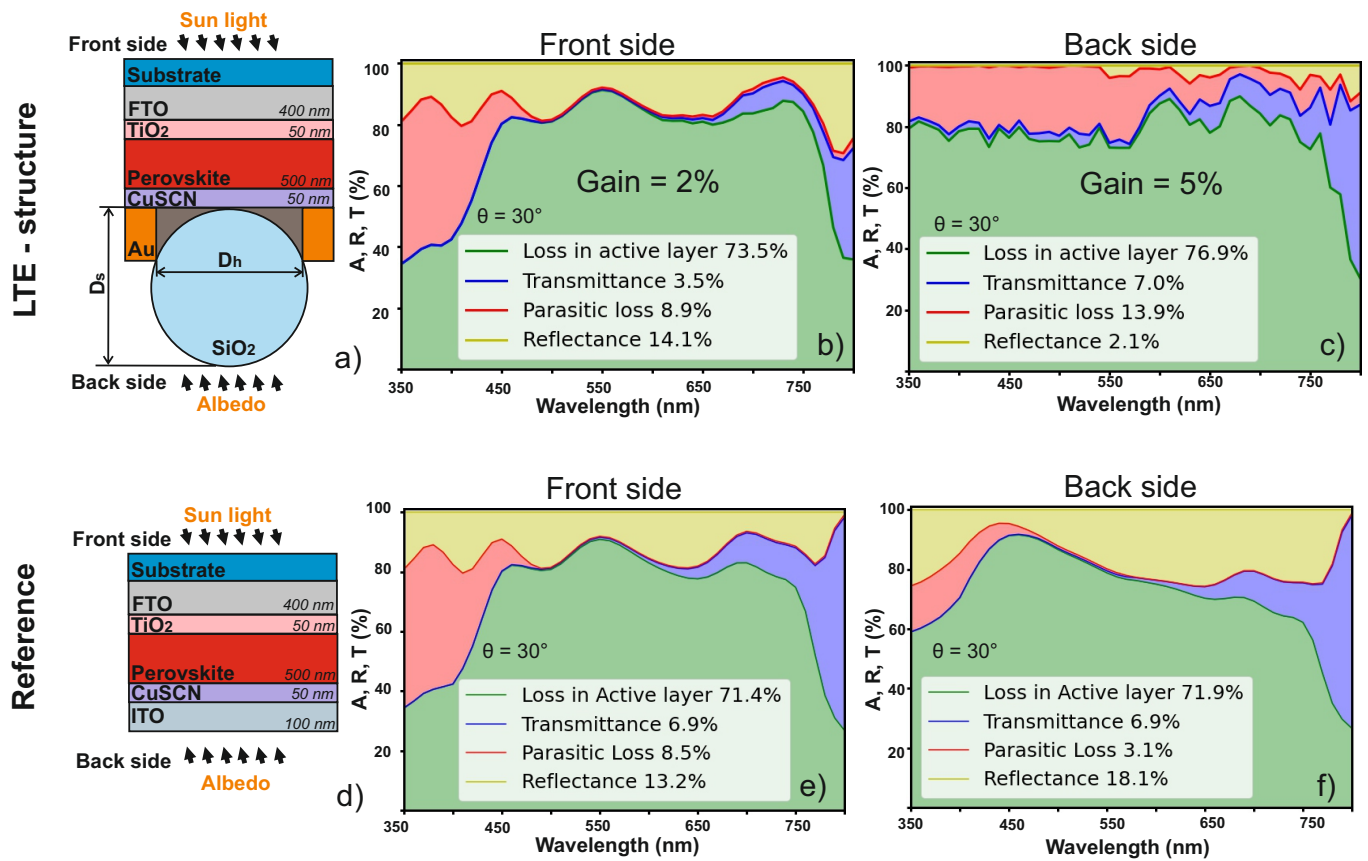
**Figure S2.** Optical characteristics for light trapping electrode and ITO in comparison: (a) transmittance, (b) reflectance.



**Figure S3.** Optical efficiency analysis of monofacial perovskite solar cells under oblique light incidence (calculated for  $\lambda = 350 - 800$  nm). (a) The scheme of light trapping structure for the monofacial cell and its (b) spectral absorption, transmission, and reflection parameters obtained under an angle of incidence  $\Theta = 15^\circ$ , (c) calculated spectral absorption, transmission, and reflection of light trapping structure for the monofacial perovskite solar cell under angle of incidence  $\Theta = 30^\circ$  (d) the scheme of the considered reference monofacial cell, (e) spectral absorption, transmission, and reflection of the reference monofacial cell structure under angle of incidence  $\Theta = 15^\circ$  and under  $\Theta = 30^\circ$  (f).



**Figure S4.** Optical efficiency analysis of the bifacial perovskite solar cell under light illumination with spectral range of  $\lambda = 350 - 800$  nm with an angle of incidence  $\Theta = 15^\circ$ . (a) The scheme of the considered light trapping structure for bifacial perovskite solar cell, (b) calculated spectral absorption, transmission, and reflection for the front side of light trapping structure for the bifacial cell, (c) spectral absorption, transmission, and reflection reached from the back side of light trapping structure of the bifacial cell, (d) the structure of the reference bifacial perovskite solar cell, (e) spectral absorption, transmission, and reflection for the front side of reference and optical parameters reached from the back side (f).



**Figure S5.** Calculated optical efficiency analysis of bifacial PSCs exposed to light illumination with  $\lambda = 350 - 800\text{nm}$  with an angle of incidence  $\Theta = 30^\circ$ . (a) The scheme of the light trapping structure for the bifacial perovskite solar cell, (b) spectral absorption, transmission, and reflection for the front side of light trapping structure for the bifacial device, (c) spectral absorption, transmission, and reflection for the back side of the light trapping structure for the bifacial cell, (d) the scheme of the reference bifacial cell and its (e) spectral absorption, transmission, and reflection for the front side and (f) spectral absorption, transmission, and reflection under illumination from the back side.