Electronic supplementary materials *Mendeleev Commun.*, 2024, **34**, 844–846

Impact of electron transport layer uniformity on field-induced degradation of inverted perovskite solar cells

Nikita A. Emelianov, Victoria V. Ozerova, Anastasia A. Bizyaeva, Mikhail S. Leshchev and Pavel A. Troshin

General

All solvents and reagents were purchased from commercial suppliers (Acros Organics, Sigma-Aldrich) and were either used as received or purified using standard methods.

Perovskite solar cells. The perovskite solar cells were assembled in the p-i-n configuration of ITO/PTAA/$Cs_xFA_{1-x}PbI_3$/ETL/Mg/Ag following the procedure reported previously.[S1]

FTIR-microscopy measurements. Fourier-transform infrared (FTIR) microscopy (iN-10, Thermo Fisher) were performed in reflection mode. The area 1500×1500 μm was scanned with resolution 50×50 pixels. In each point, 8 spectra were collected.

Infrared scanning near-field microscopy (IR s-SNOM) measurements. The infrared scanning near-field microscopy (IR s-SNOM) (neaSNOM, Neaspec) were performed in PsHet mode with a Mid-IR laser MIRcat-2400 (Daylight Solutions) inside an MBraun glove box. ARROW-NCPt (NANOWORLD, Neuchâtel, Switzerland) cantilevers with PtIr coatings with a probe radius of <25 nm, with a typical resonance frequency of 285 kHz and a stiffness of 42 N m^{-1} were used. The cantilever oscillation amplitude reached 50–65 nm. The area 5×5 μm was scanned with resolution 200×200 pixels with speed 1.5 μm s^{-1}.

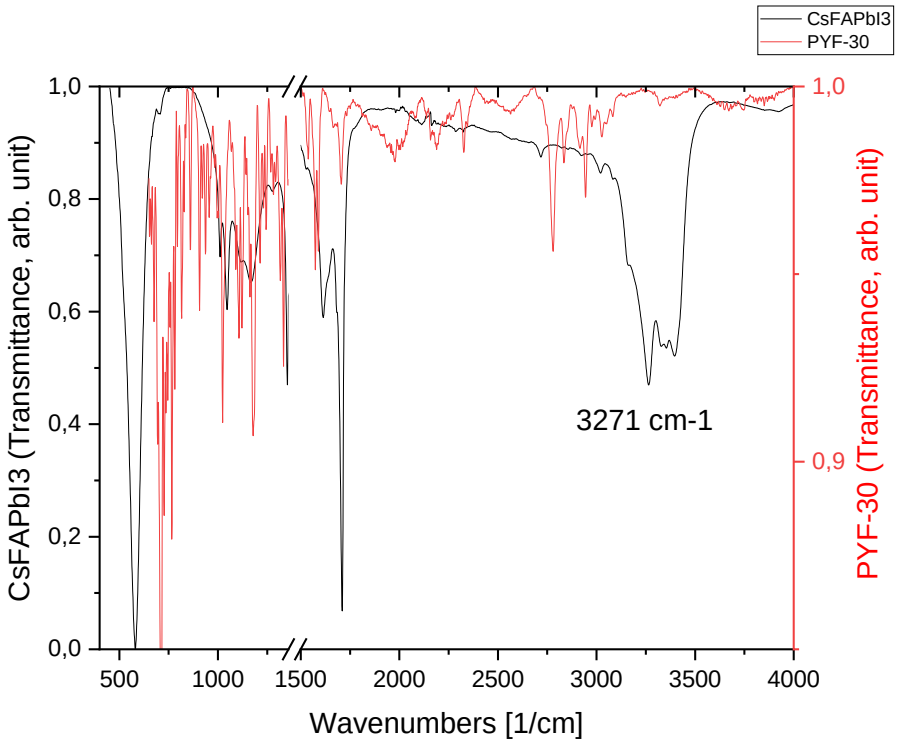

Figure S1 FTIR spectra for $Cs_{0.15}FA_{0.85}PbI_3$/PYF-30. Frequency 3271 cm^{-1}, corresponding to N-H stretching vibration in formamidinium cation selected for FTIR-microscopy.

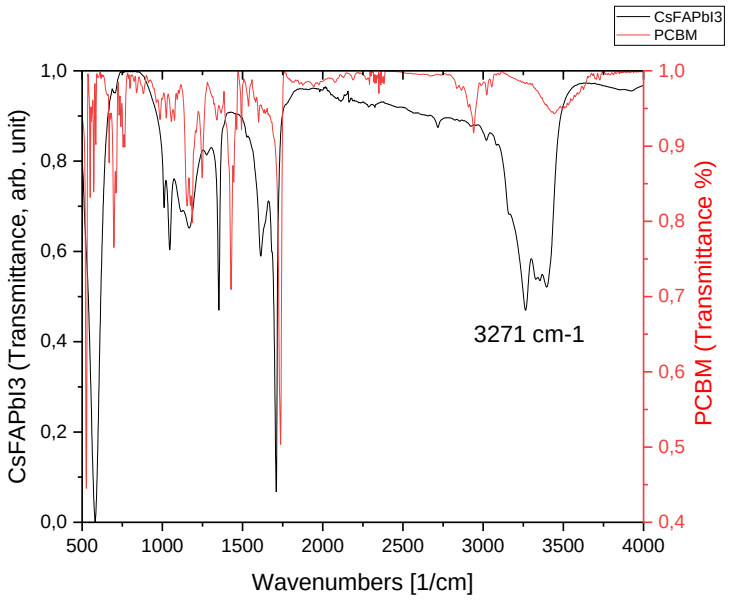

Figure S2 FTIR spectra for $Cs_{0.15}FA_{0.85}PbI_3/PC_{61}BM$. Frequency 3271 cm^{-1}, corresponding to N-H stretching vibration in formamidinium cation selected for FTIR-microscopy.

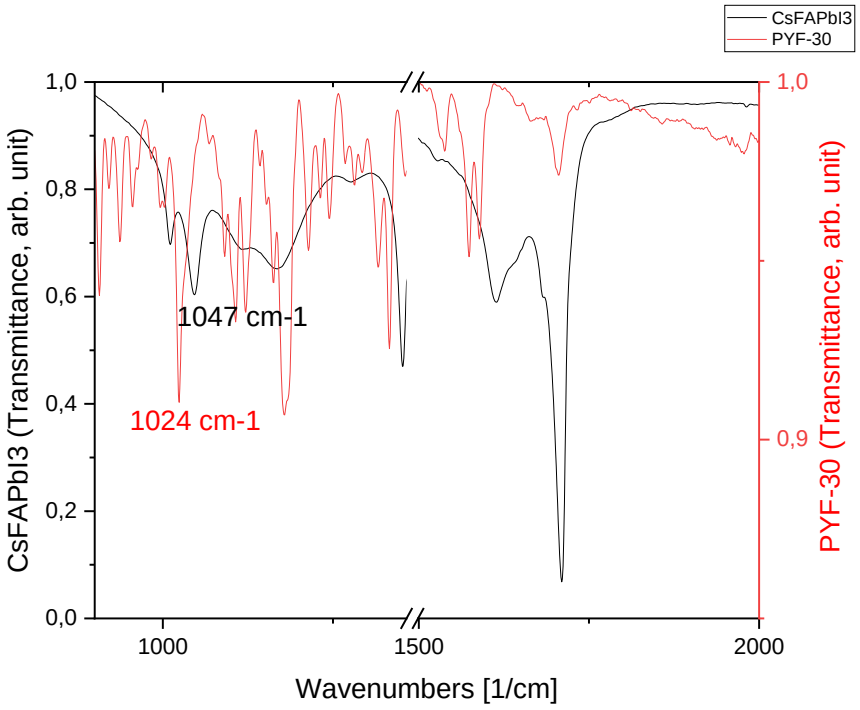

Figure S3 FTIR spectra for $Cs_{0.15}FA_{0.85}PbI_3$/PYF-30 with selected for IR s-SNOM microscopy perovskite (1047 cm^{-1}) and ETL (1024 cm^{-1}) frequencies.

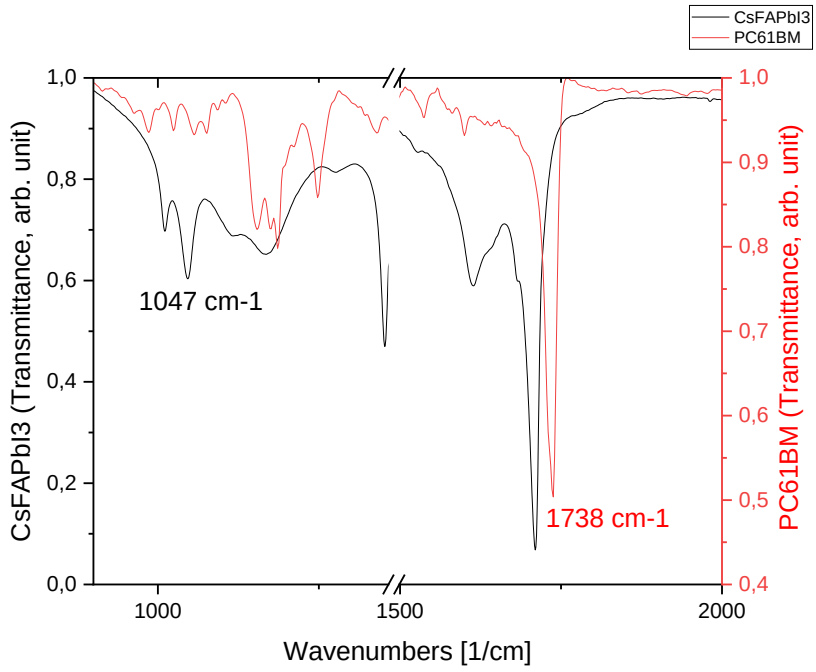

Figure S4 FTIR spectra for $Cs_{0.15}FA_{0.85}PbI_3$/ $PC_{61}BM$ with selected for IR s-SNOM microscopy perovskite (1047 cm^{-1}) and ETL (1738 cm^{-1}) frequencies.

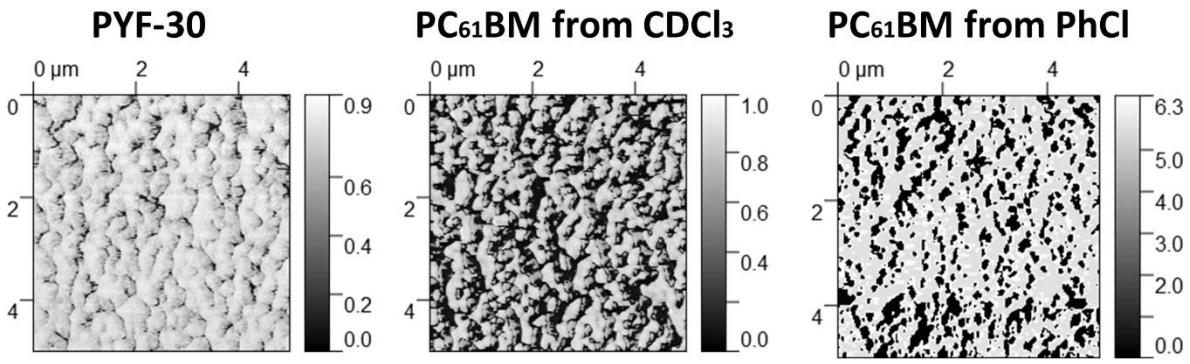

Figure S5 AFM phase-contrast images of ETL layers after 1000 hours of field-induced aging.

Reference

S1 V. V. Ozerova, N. A. Emelianov, L. A. Frolova, Y. S. Fedotov, S. I. Bredikhin, S. M. Aldoshin and P. A. Troshin, *Sustainable Energy Fuels*, 2024, **8**, 997.