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Supporting Information

High Open-Circuit Voltage $Cs_2AgBiBr_6$ Carbon-Based Perovskite Solar Cells via Green Processing of Ultrasonic Spray-Coated Carbon Electrodes from Waste Tire Sources

Fabian Schmitz[+], Nicolò Lago[+], Lucia Fagiolari, Julian Burkhart, Andrea Cester, Andrea Polo, Mirko Prato, Gaudenzio Meneghesso, Silvia Gross, Federico Bella,* Francesco Lamberti,* and Teresa Gatti*This publication is part of a Special Collection highlighting “The Latest Research from our Board Members”. Please visit the Special Collection at .

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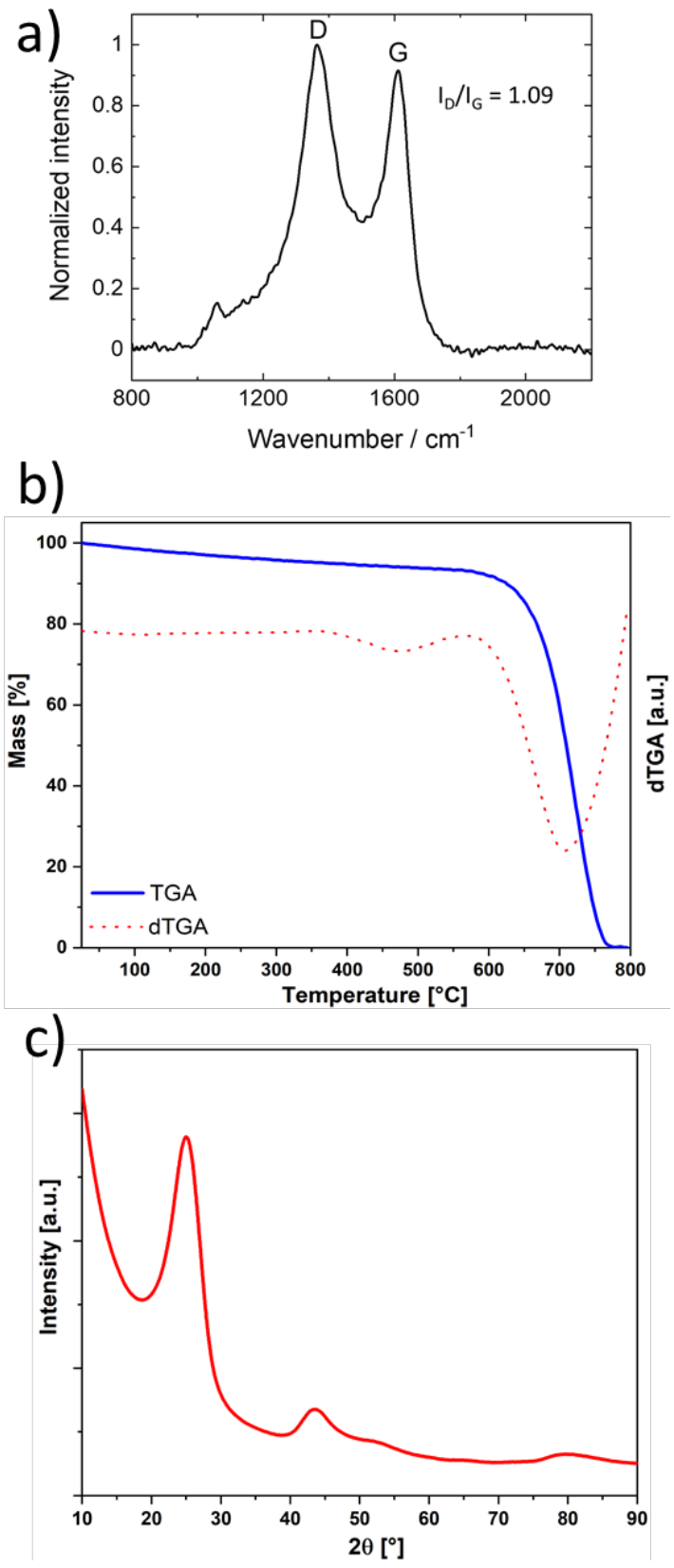

Figure S1. a) Raman plot, b) TGA thermogram and c) P-XRD trace for tire-derived carbon black.

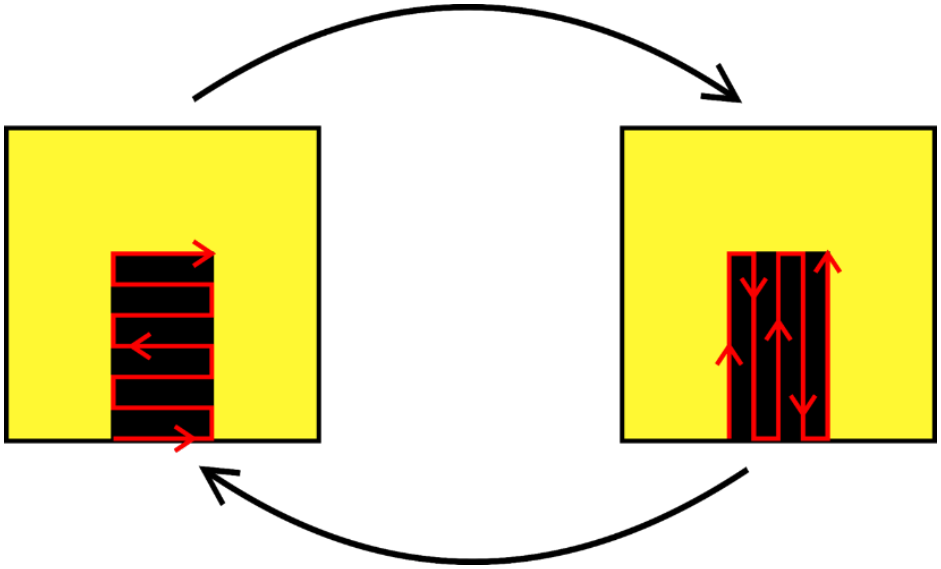

Figure S2. CE US deposition pattern on top of the FTO/TiO_2/$Cs_2AgBiBr_6$ direct PSC architecture.

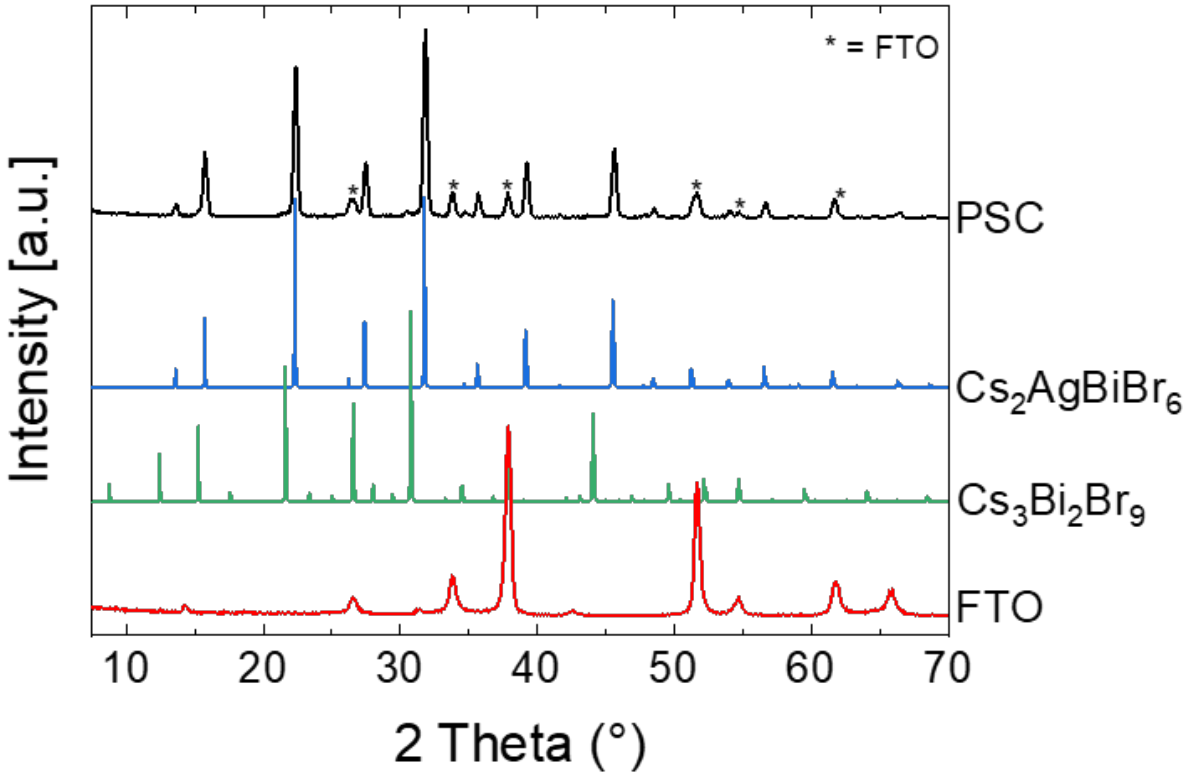

Figure S3. GIXRD pattern of the FTO/TiO_2/$Cs_2AgBiBr_6$/CE C-PSC. The measured GIXRD pattern for the FTO substrate and the theoretical patterns of the $Cs_2AgBiBr_6$ double perovskite and of the typical side-phase $Cs_3Bi_2Br_9$ are also reported for the sake of comparison, showing that no side phase is present (or at least detectable) in the solar cell architecture.

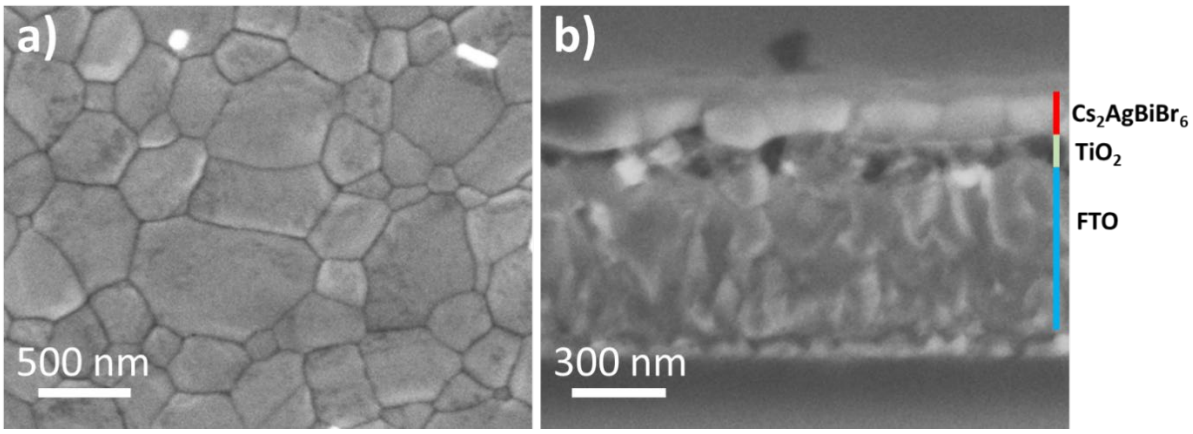

Figure S4. Top-view a) and cross-section b) SEM images of the $Cs_2AgBiBr_6$ double perovskite thin film processed on top of a FTO/compact TiO_2 substrate.

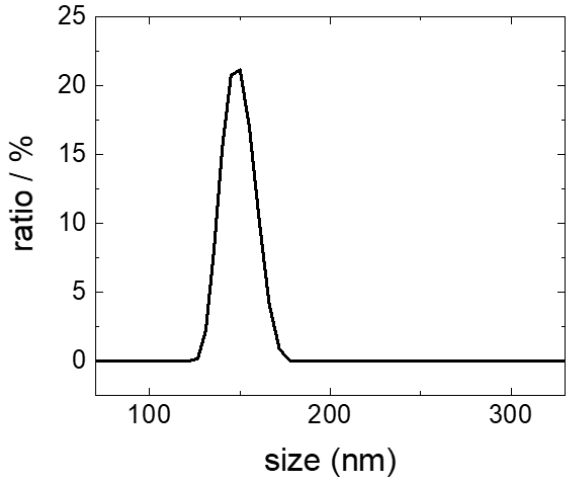

Figure S5. DLS spectrum of the 0.1 mg/mL carbon ink in iPA prepared after tip-sonication and used for US spray coating.

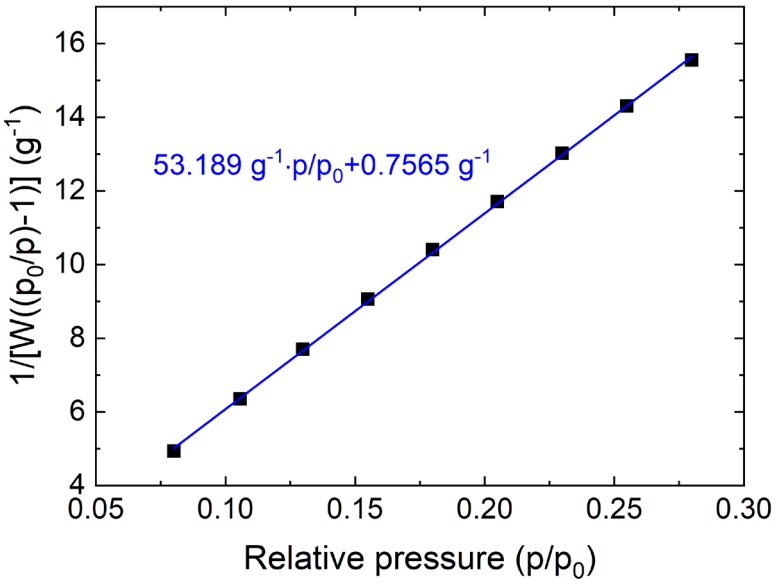

Figure S6. Argon physisorption measurements (black dots) and BET fit (blue) to calculate the specific surface area of the carbon black powder.

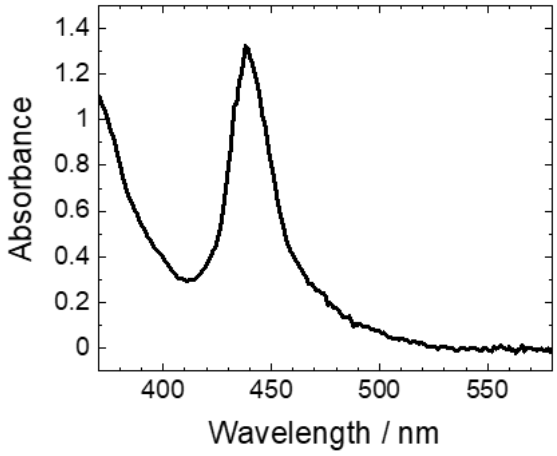

Figure S7. UV-visible absorption spectrum of the FTO/TiO_2/$Cs_2AgBiBr_6$ junction.

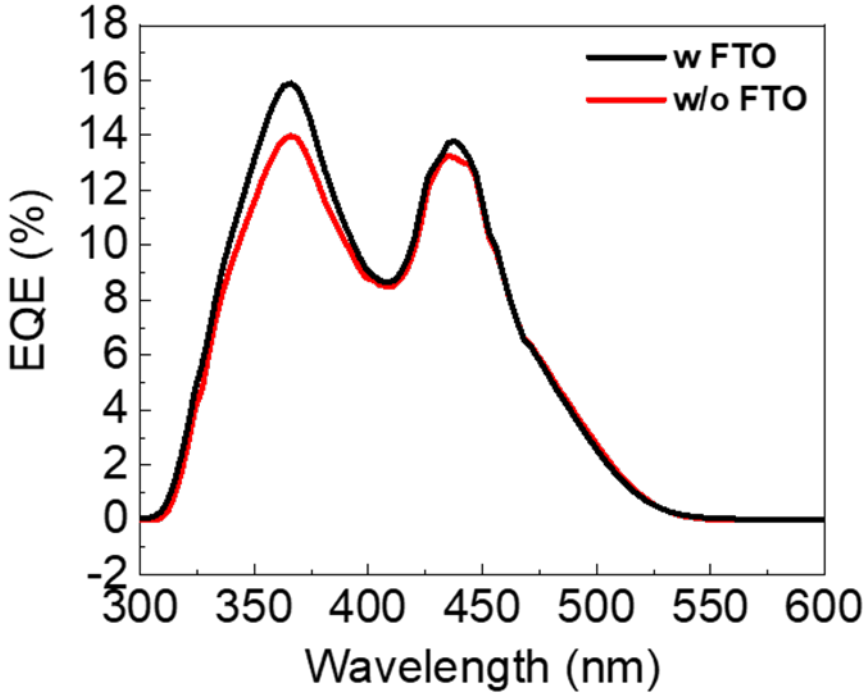

Figure S8. EQE spectra of a FTO/TiO2/$Cs_2AgBiBr_6$/CE C-PSC with and without application of a clean FTO electrode on top of the CE.

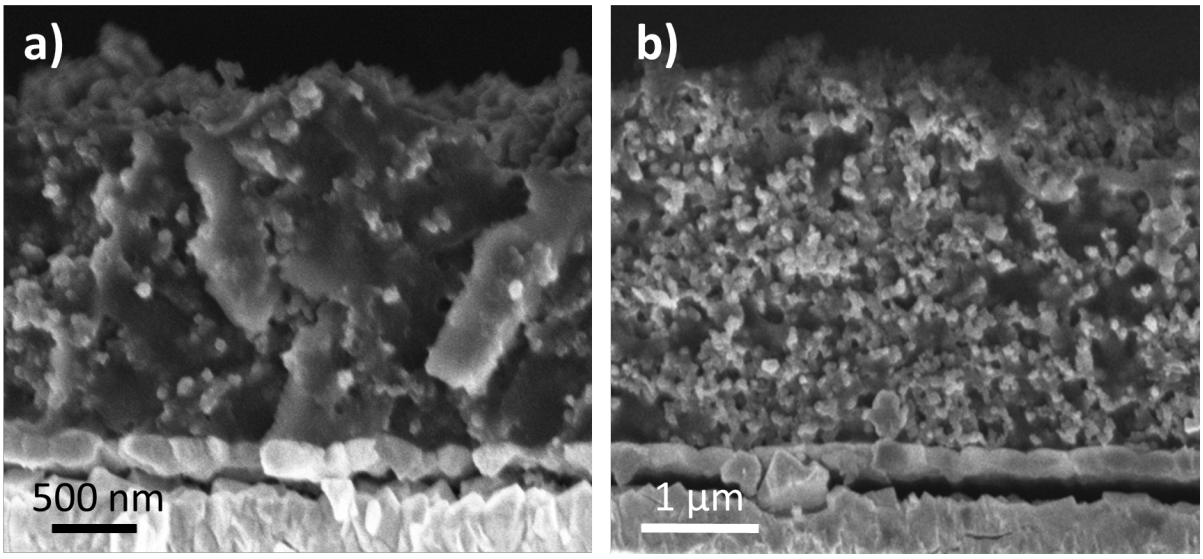

Figure S9. SEM cross-section images of C-PSCs based on screen-printed CEs prepared from a) iPA/PVP/carbon paste and b) CB/PMMA/carbon paste.

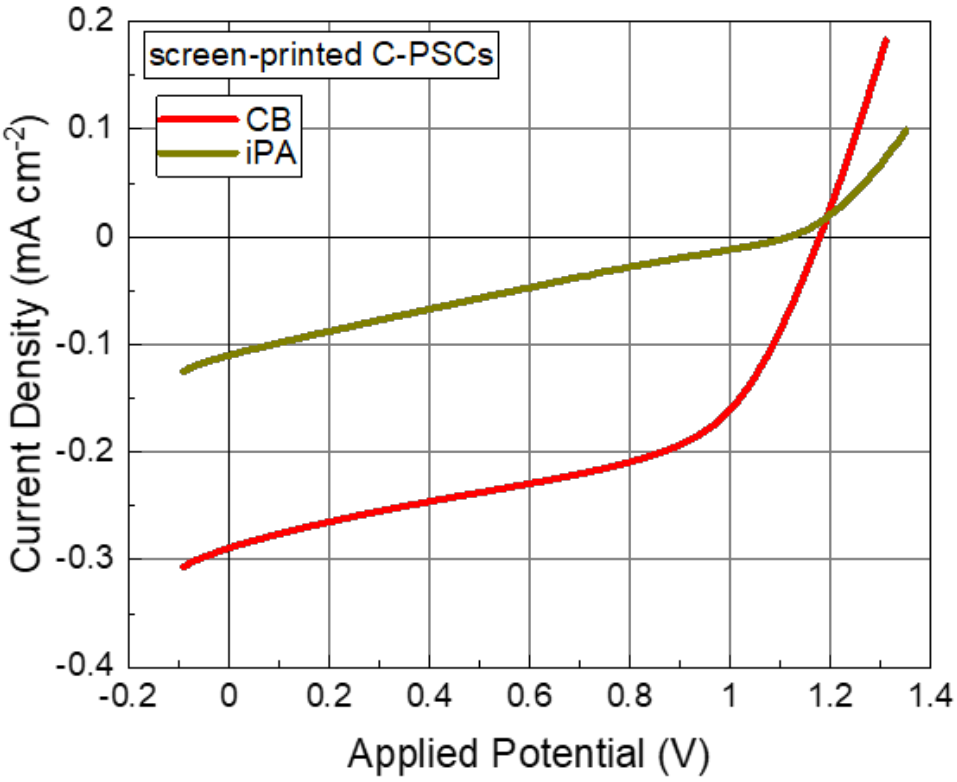

Figure S10. Prototypical J-V characteristics for C-PSCs based on screen-printed CEs prepared from iPA and CB pastes.