

Article

Influence of the Electron Selective Contact on the Interfacial Recombination in Fresh and Aged Perovskite Solar Cells

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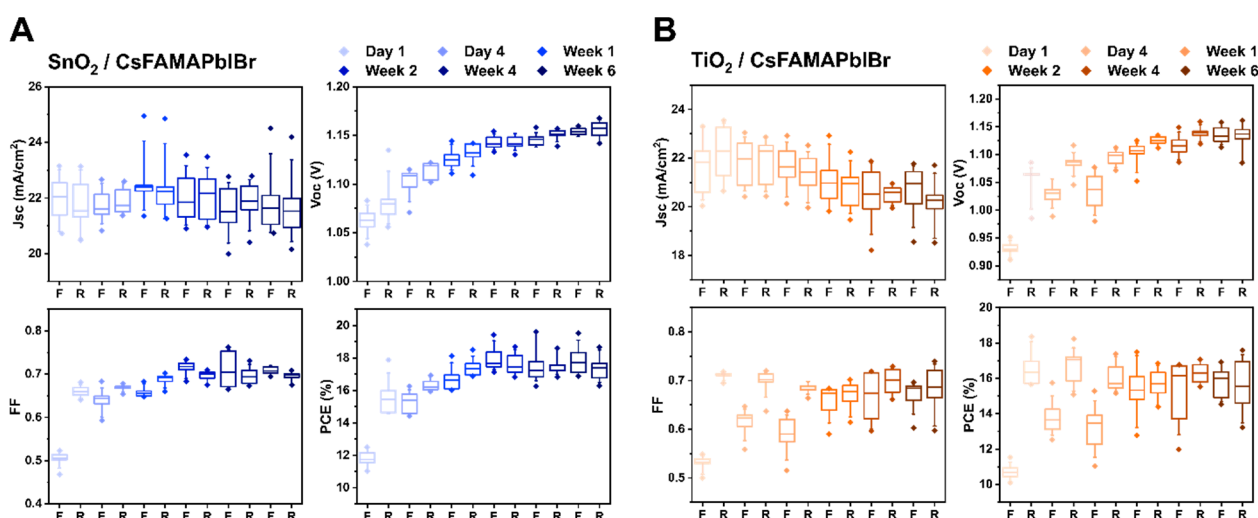


Figure S1. Photovoltaic parameters of an average of 10 devices measured on fresh devices, and after 4 days, 1, 2, 4 (28 days), and 6 weeks for (A) SnO₂/CsFAMAPbIBr, (B) TiO₂/CsFAMAPbIBr.

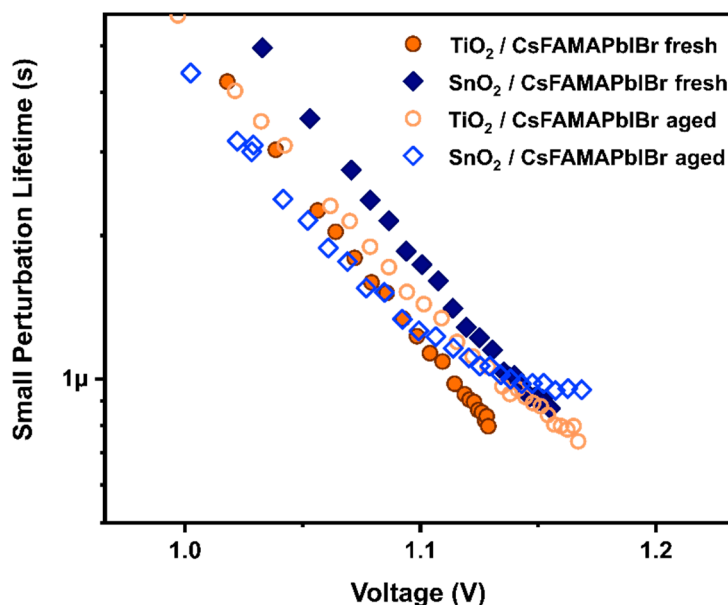


Figure S2. Small perturbation lifetimes obtained from the exponential fitting of the TPV decays as a function of the light bias for the CsFAMAPbIBr samples deposited on top of TiO₂ (orange circles) or SnO₂ (blue diamonds) as ETM. The samples were measured fresh (filled) and after the aging treatment (empty).

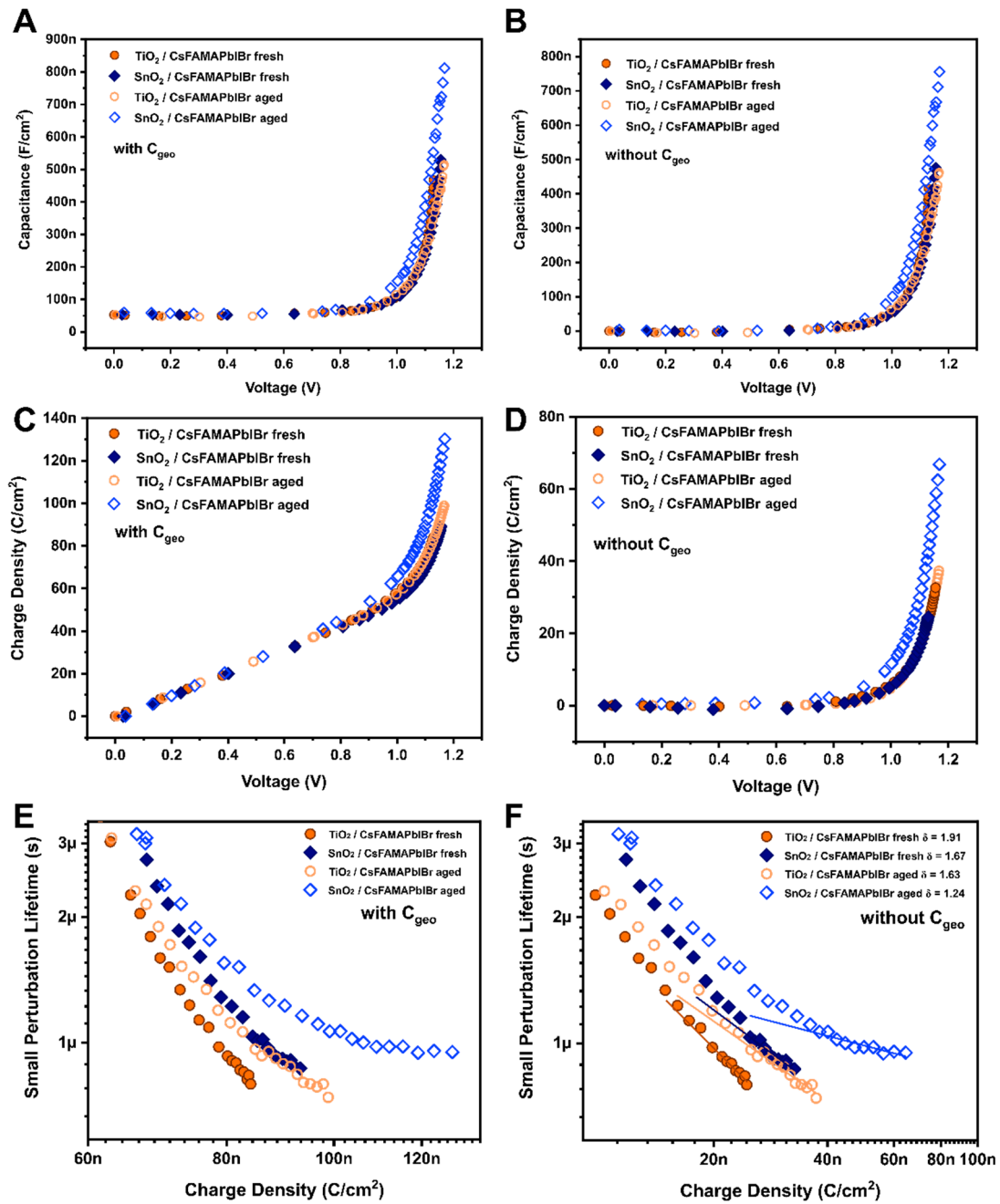


Figure S3. Capacitance obtained from the DiffCap method at different voltages (A) and after subtracting the geometric capacitance (charges accumulated at the contacts) (B). Charge density obtained at different voltages after the integration of the capacitance obtained with the DiffCap method, including carriers in the bulk and in the contacts (C). Charge density accumulated in the perovskite bulk (D). Small perturbation lifetime as a function of the total charge density accumulated in the device (charges in the bulk and in the contacts) (E). Small perturbation lifetime as a function of the charge density accumulated in the bulk of the perovskite. The lines represent the power law fitting $\tau_{\Delta n} = \tau_{\Delta n 0} \left(\frac{Q}{Q_0} \right)^{-\lambda}$ used to calculate the recombination order ($\delta = \lambda + 1$) of the devices (F).

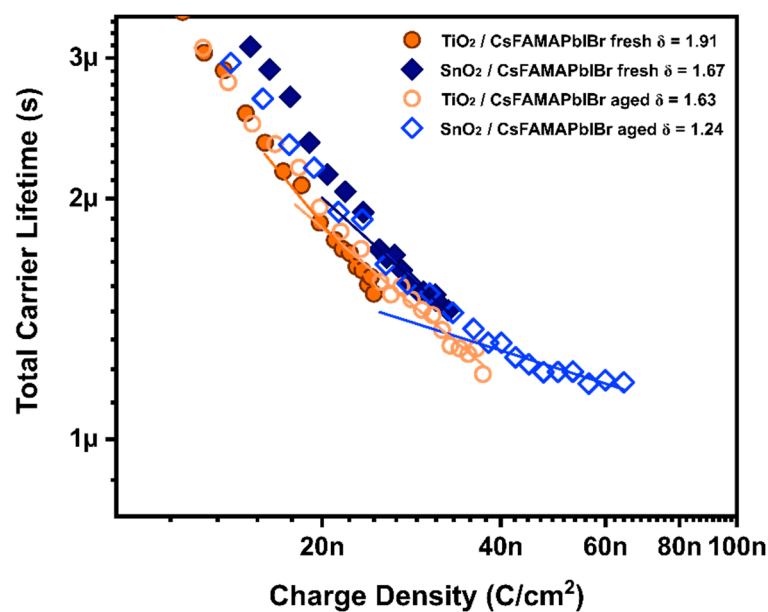


Figure S4. Total carrier lifetime ($\tau = \tau_{\Delta n} \cdot \delta$) as a function of the charge density stored in the bulk of the perovskite.

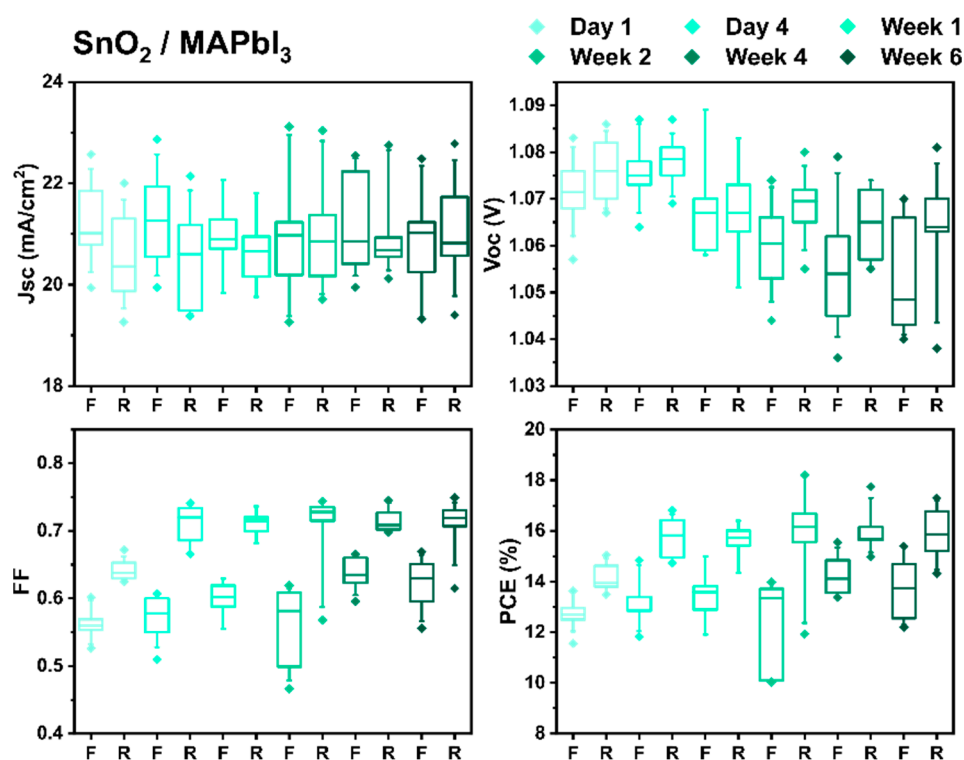


Figure S5. Photovoltaic parameters of an average of 10 devices measured on fresh devices, and after 4 days, 1, 2, 4 (28 days), and 6 weeks for SnO₂/MAPbI₃.

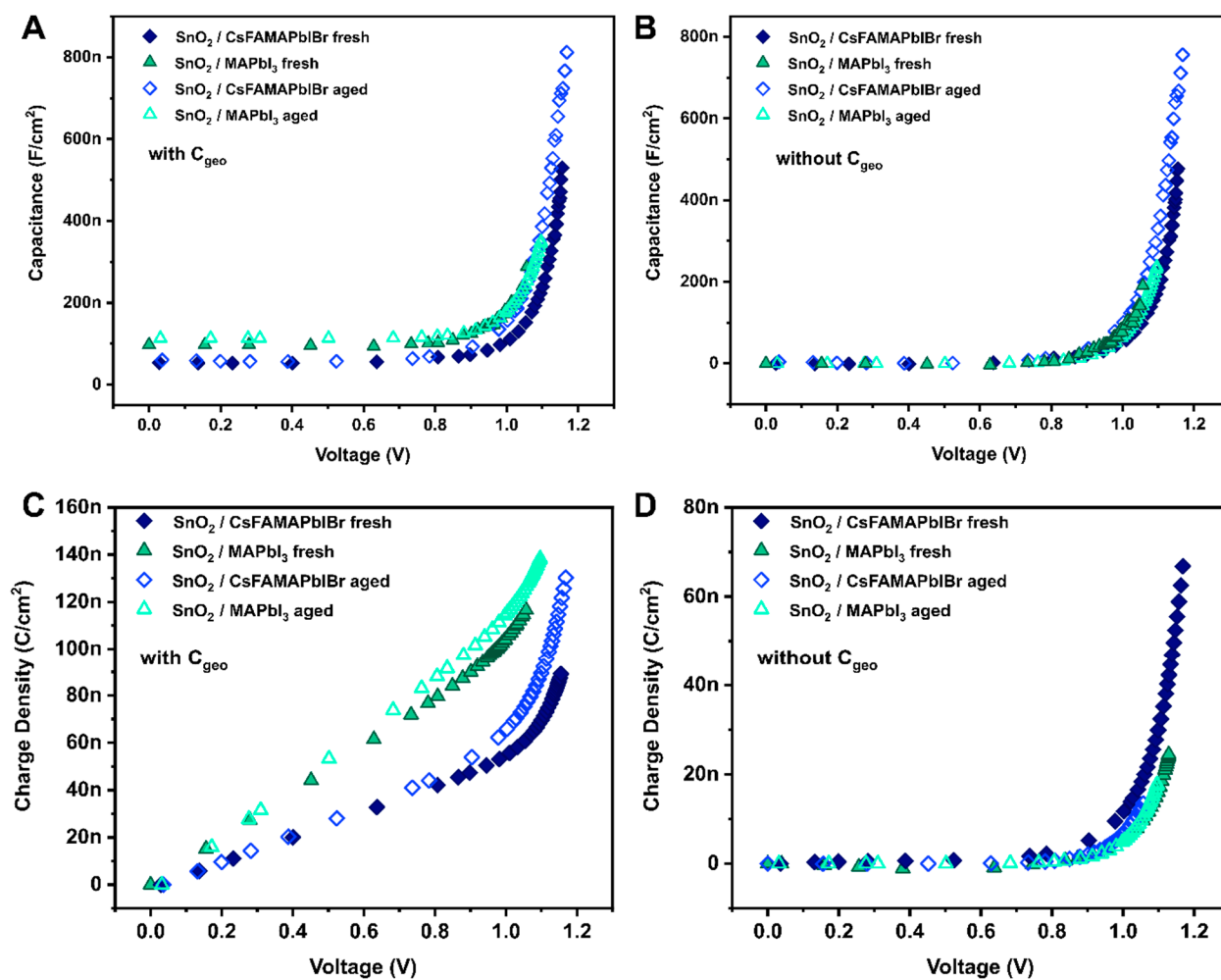


Figure S6. Capacitance obtained from the DiffCap method at different voltages (A) and after subtracting the geometric capacitance (charges accumulated at the contacts) (B). Charge density obtained at different voltages after the integration of the capacitance obtained with the DiffCap method, including carriers in the bulk and in the contacts (C). Charge density accumulated in the perovskite bulk (D).

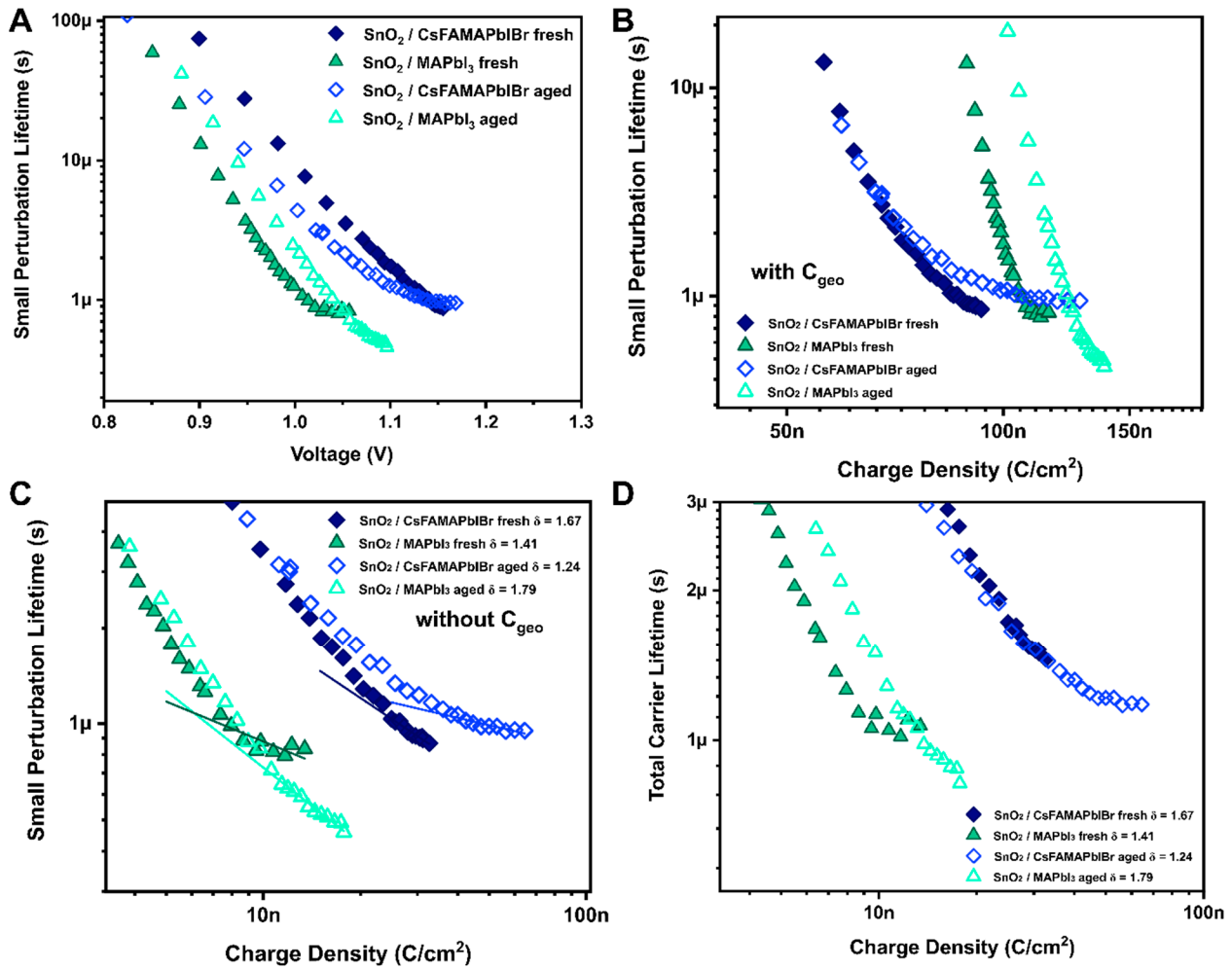


Figure S7. Small perturbation lifetimes obtained from the exponential fitting of the TPV decays as a function of the light bias (**A**) for the CsFAMAPbIBr (blue) and MAPbI₃ (green) samples desposited on top of SnO₂ as ETM. The samples were measured fresh (darker colors) and after the aging treatment (lighter colors). Small perturbation lifetime as a function of the total charge density accumulated in the device (charges in the bulk and in the contacts) (**B**). Small perturbation lifetime as a function of the charge density accumulated in the bulk of the perovskite. The lines represent the power law fitting $\tau_{\Delta n} = \tau_{\Delta n 0} (Q/Q_0)^{-\lambda}$ used to calculate the recombination order ($\delta = \lambda + 1$) of the devices (**C**). Total carrier lifetime ($\tau = \tau_{\Delta n} \cdot \delta$) as a function of the charge density stored in the bulk of the perovskite (**D**).