

Supplementary Information for

**The Importance of Dye Chemistry and TiCl_4 Surface Treatment in the
Behavior of Al_2O_3 Recombination Barrier Layers Deposited by Atomic Layer
Deposition in Solid-State Dye-Sensitized Solar Cells**

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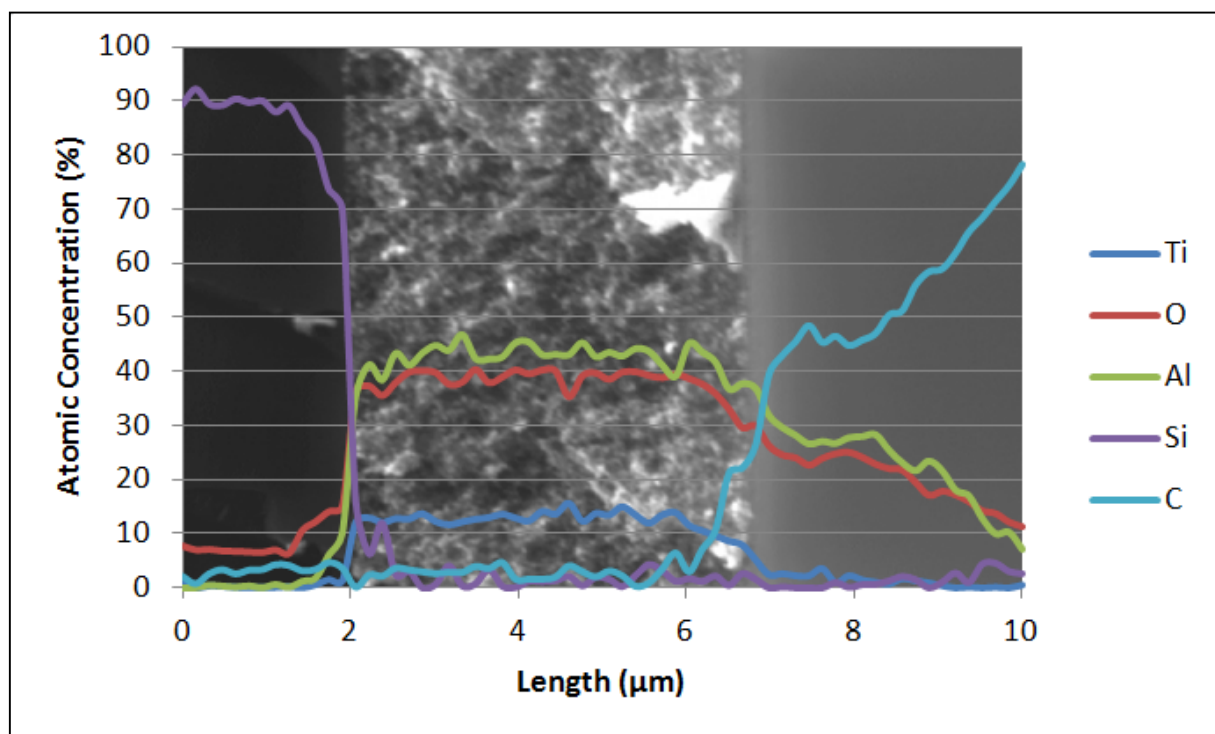


Figure S1 Cross-sectional Auger electron spectroscopy line-scan after 10 ALD cycles of Al_2O_3 on a $\sim 5 \mu\text{m}$ thick nanoporous TiO_2 film on a Si substrate. The line scan was performed through the middle of the scanning electron microscopy image, i.e. the 50% atomic concentration line. While the exact atomic concentration is subject to instrument sensitivity limits and baselines chosen, the data clearly indicate uniform growth of Al_2O_3 throughout the $5 \mu\text{m}$ thick TiO_2 film.

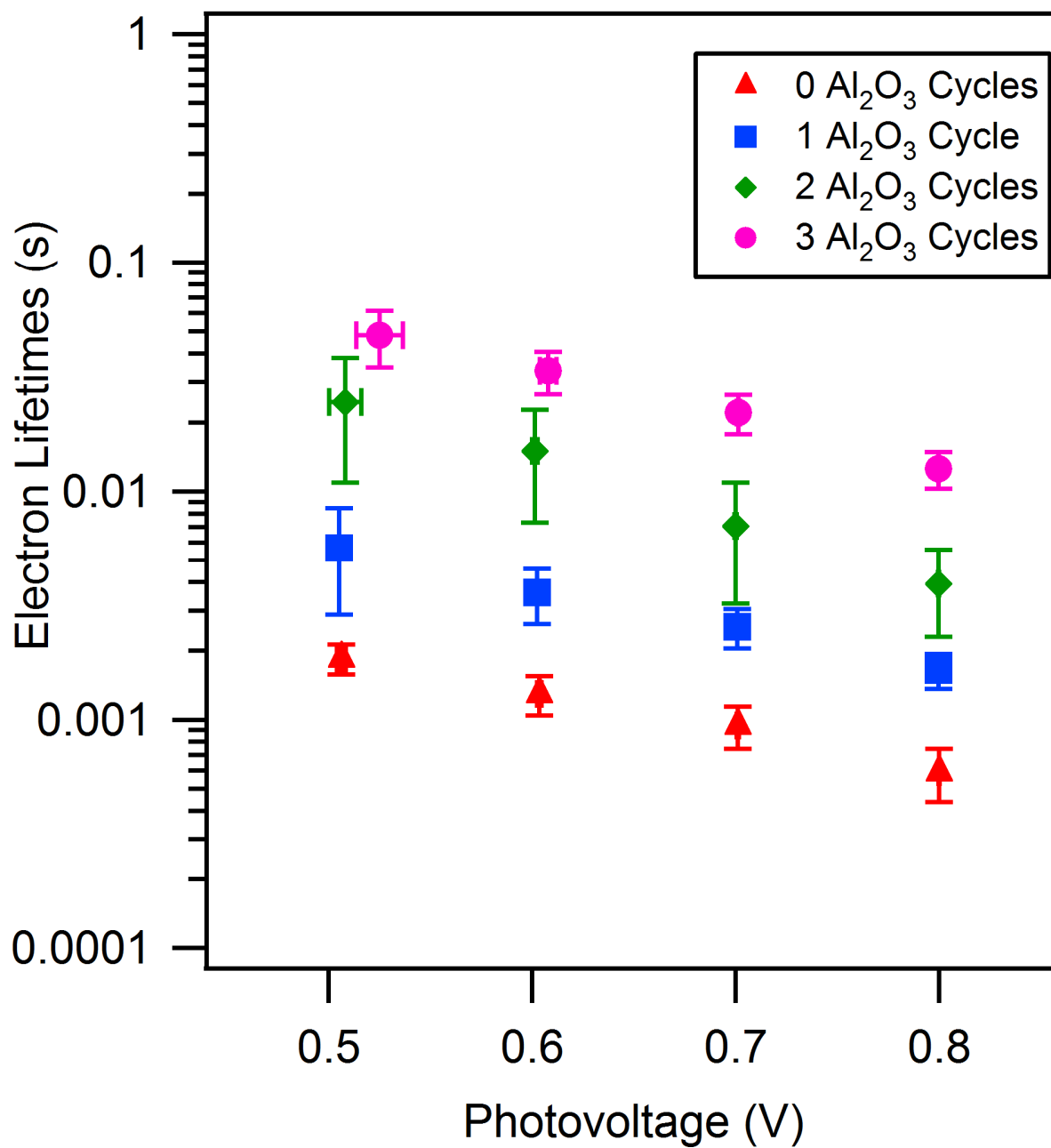


Figure S2 Electron Lifetimes for Z907 devices with thick TiO₂ active layers. Error bars indicate standard deviations.

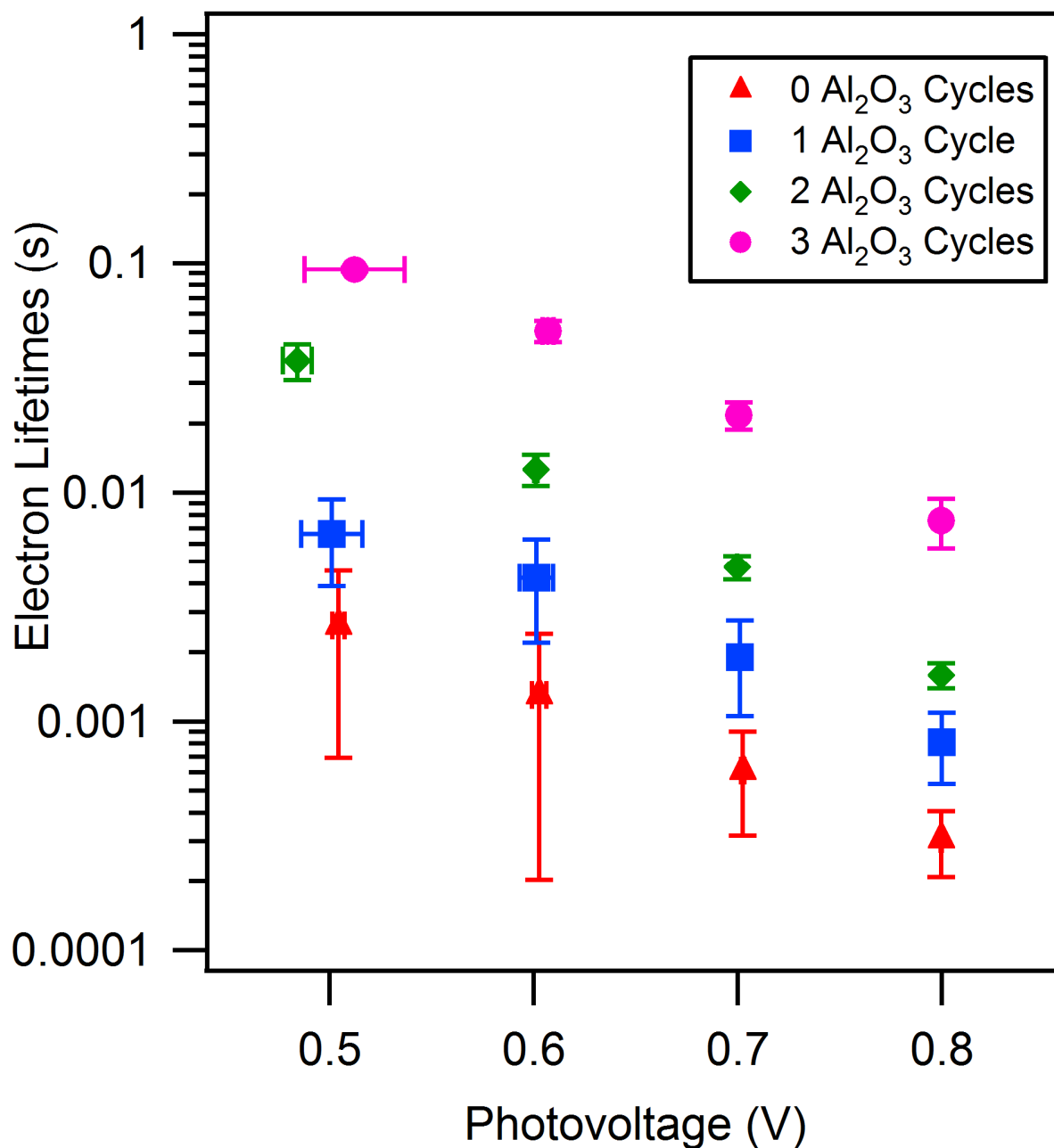


Figure S3 Electron lifetimes for devices with the Z907 dye without the TiCl₄ treatment for different numbers of ALD cycles. Error bars indicate standard deviations.

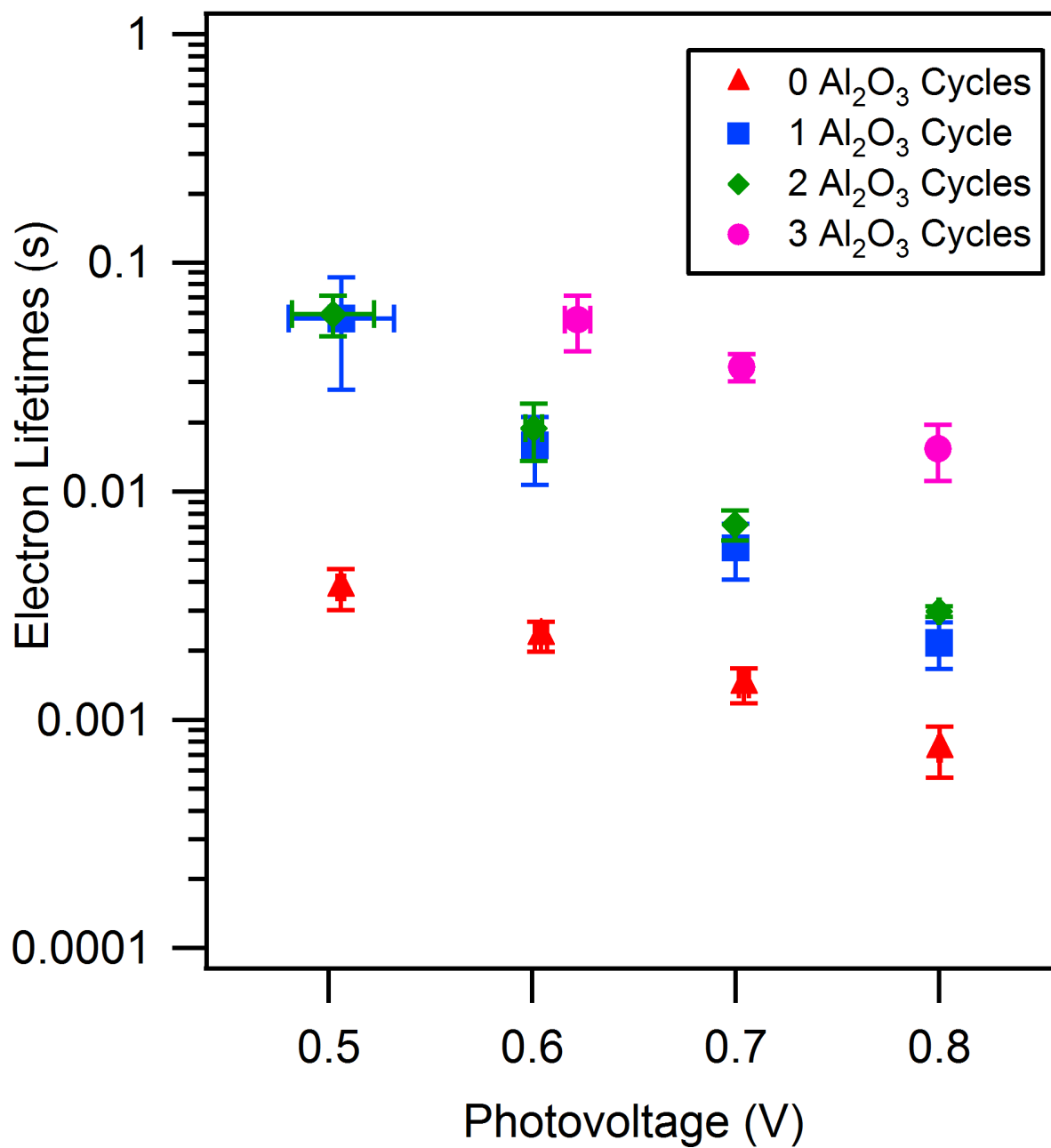


Figure S4 Electron lifetimes for devices with the YE05 dye for different numbers of ALD cycles. Error bars indicate standard deviations.

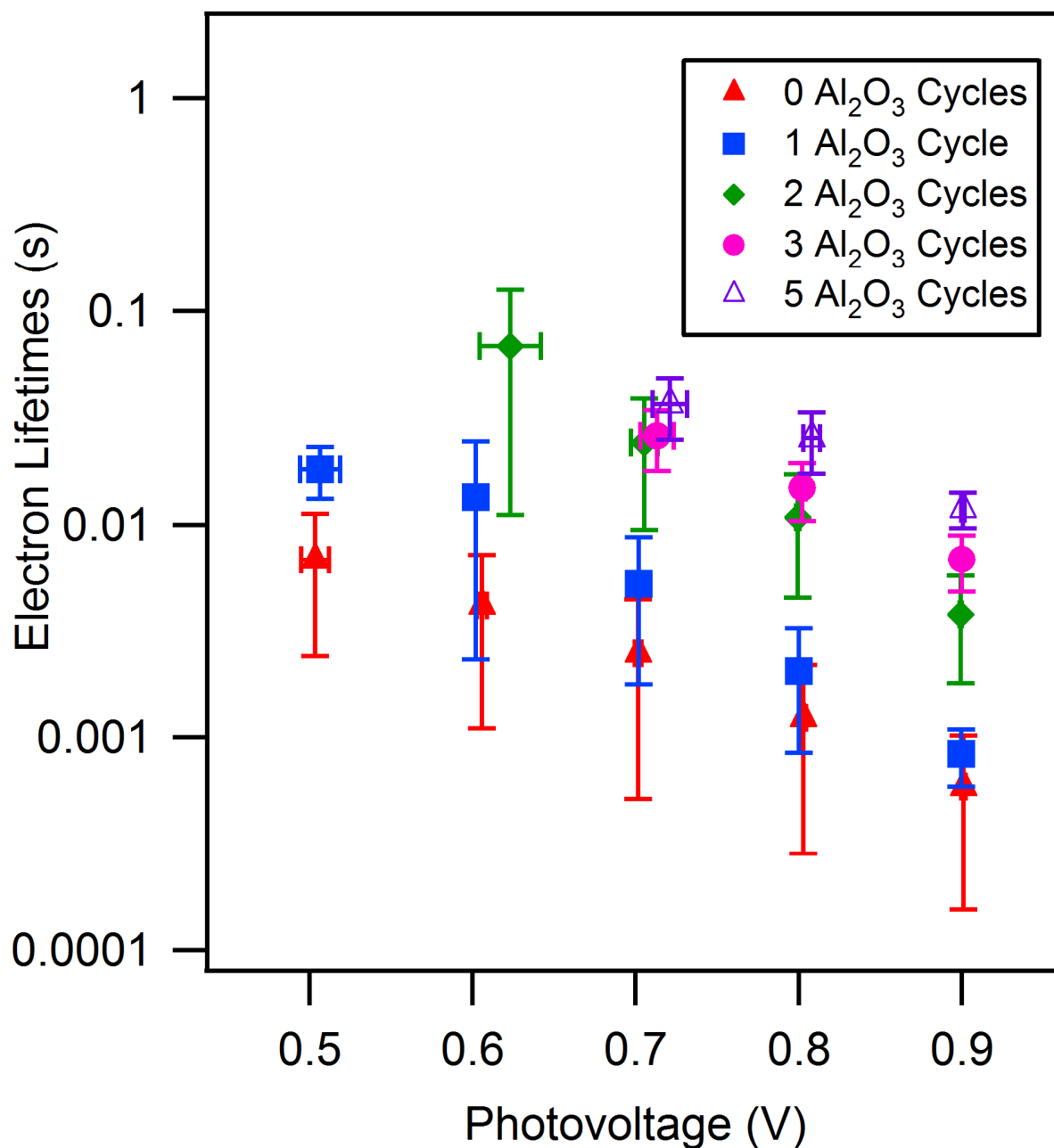


Figure S5 Electron lifetimes for devices with the WN1 dye for different numbers of ALD cycles. Lifetimes are higher than in cells with Ru dyes, consistent with the higher V_{oc} 's observed in WN1 devices. Error bars indicate standard deviations.