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Transient photovoltaic behavior of air-stable inverted organic solar cells with solution-processed electron transport layer and high work function top electrode CHANG SU KIM, YUEH-LIN (LYNN) LOO, CHEMICAL ENGINEERING, PRINCETON UNIVERSITY TEAM — In this study, we made air-stable inverted organic solar cells comprising sol-gel derived TiOx as the electron transport layer and Au as the high work function top electrode. The highly transparent TiOx layer, placed between the ITO cathode and the active layer, smooths out ITO and provides better alignment of energy levels for electron transport. The conductivity of TiOx is known to increase with increasing exposure time to light as the excited electrons fill up shallow traps during illumination. The short circuit current of our inverted solar cells thus increases from 1.41mA/cm2 to 8.13mA/cm2 under continuous illumination for 10 minutes. In addition, when our inverted solar cells are stored in air for extended periods of time, the open circuit voltage increases due to oxygen doping of poly(3-hexylthiophene). Exposure to air for 2 days, for example, increases the open circuit voltage from -0.38V to -0.53V.

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