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**Polymer Solar Cells, Deconstructed** YUEH-LIN LOO, JONGBOK KIM, HE WANG, STEPHANIE LEE, Chemical and Biological Engineering Department, Princeton University, ZELEI GUAN, ANTOINE KAHN, Electrical Engineering Department, Princeton University — Soft-contact lamination and delamination has enabled us to construct polymer solar cells for testing, and deconstruct them subsequently for structural characterization of the active layers and electronic characterization of relevant charge transfer interfaces. We have thus been able to characterize buried active layers and interfaces that are otherwise inaccessible. Structural characterization post-device fabrication and testing reveals simultaneous crystallization of the polymer donor and the electron acceptor in the once-buried bulk-heterojunction active layers to be responsible for photocurrent enhancement in these devices. Electronic characterization of the active layer-bottom electrode interface reveals an electronic band gap of 1.5 eV, attributable to the difference between the ionization potential of the polymer donor and the electron affinity of the electron acceptor. This value is significantly larger than the band gap predicted by examining the energy levels of the individual constituents, likely due to the presence of interfacial dipoles when the polymer donor and the electron acceptor are intimately mixed.

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