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**The Science of Making Organic Solar Cells Stable**

MICHAEL MCGEHEE, Stanford University

As organic PV efficiencies exceed 10%, the science of stabilization and lifetime gains importance. We seek the origin of the exponential decrease, or "burn-in," of OPV device efficiency in the first 200 hours of operation. First, we examine an efficient polymer, PCDTBT, and demonstrate a 6.2 year lifetime. For standard PCDTBT devices, burn-in is not caused by reactions at the transport layers; rather, it is caused by photochemical traps. We hypothesize that impurities could play a role. The effect of impurities is investigated in another polymer, PBDTTPD, with an 8.3% PCE. For PBDTTPD we find that degradation correlates to the presence of small, organic impurities. We stabilize PBDTTPD, without diminishing performance, by purifying it further. We also investigate the fullerene's role in degradation using photobleaching experiments, and find that photoactive layer stability correlates with the fullerene's electron affinity. From our conclusions, we outline strategies for improving OPV device stability.