

Abstract Submitted
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Cylindrical Organic Solar Cells with Carbon Nanotube Charge Collectors¹ DANTE ZAKHIDOV, RAYMOND LOU, NAV RAVI, TAMS at UNT, KAMIL MIELCZAREK, ALEXANDER COOK, UTD, NANOEXPLORERS TEAM — Traditional organic photovoltaic devices (OPV) are built on a flat glass substrates coated by ITO. The maximum area covered by the solar cells is limited to a two dimensional plane. Moreover the light absorption is not maximized for a very thin photoactive layer. We suggest here a cylindrical design which has a vertical structure of optical fiber coated by OPV, with light incident from the side and from edge. The sunlight, entering via a smaller area is captured into optical fiber, which allows more sunlight to be absorbed by a cylindrical OPV overcoating with multiple reflections inside the optical fiber. Instead of using brittle ITO as a hole collecting layer in the cylindrical OPV, transparent sheets of multi-walled carbon nanotubes are applied. Their highly conductive nature and 3-D collection of carriers from the P3HT/PCBM photoactive layer allows for increased efficiency over a planar geometry while keeping the device transparent. Aluminum is used as the electron collecting layer and as a cylindrical mirror.

[1] Ulbricht, et.al, phys. stat. sol. (b) 243, No. 13, 3528 - 3532 (2006) / DOI 10.1002/pssb.200669181

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