Enhanced Open Circuit Voltage in Subphthalocyanine/C_{60} Organic Photovoltaic Cells

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Supporting Information

Experimental conditions for device fabrication and testing.

The PV cells were grown on ITO-coated glass substrates that were solvent cleaned[1] and treated in UV-ozone for 10 minutes immediately prior to loading into a high vacuum (~3 x 10^{-6} Torr) chamber. The organic materials, SubPc (Aldrich), CuPc (Aldrich), C_{60} (MTR Limited), and 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline (BCP) (Aldrich) were purified by sublimation prior to use. Metal cathode materials, Ag and Al (Alfa Aesar) were used as received. Materials were sequentially grown by vacuum thermal evaporation at the following rates: SubPc (1 Å/sec) or CuPc (2 Å/sec), C_{60} (2 Å/sec), and 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline (BCP) (1.5 Å/sec) and metals: 1000 Å thick Ag (4 Å/sec) or Al (2.5 Å/sec). The cathode was evaporated through a shadow mask with 1 mm diameter openings. Current-voltage (*J*-*V*) characteristics of PV cells were measured under simulated AM1.5G solar illumination (Oriel Instruments) using a Keithley 2420 3A Source Meter. Neutral density filters were used to vary light intensity that was measured with a calibrated broadband optical power meter.

Figure S1. Copper phthalocyanine (CuPc) (a) and boron subphthalocyanine chloride (SubPc) (b) structures.

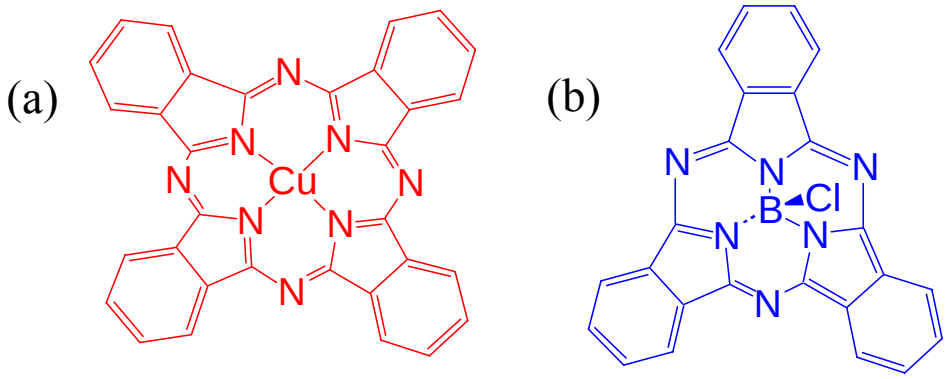
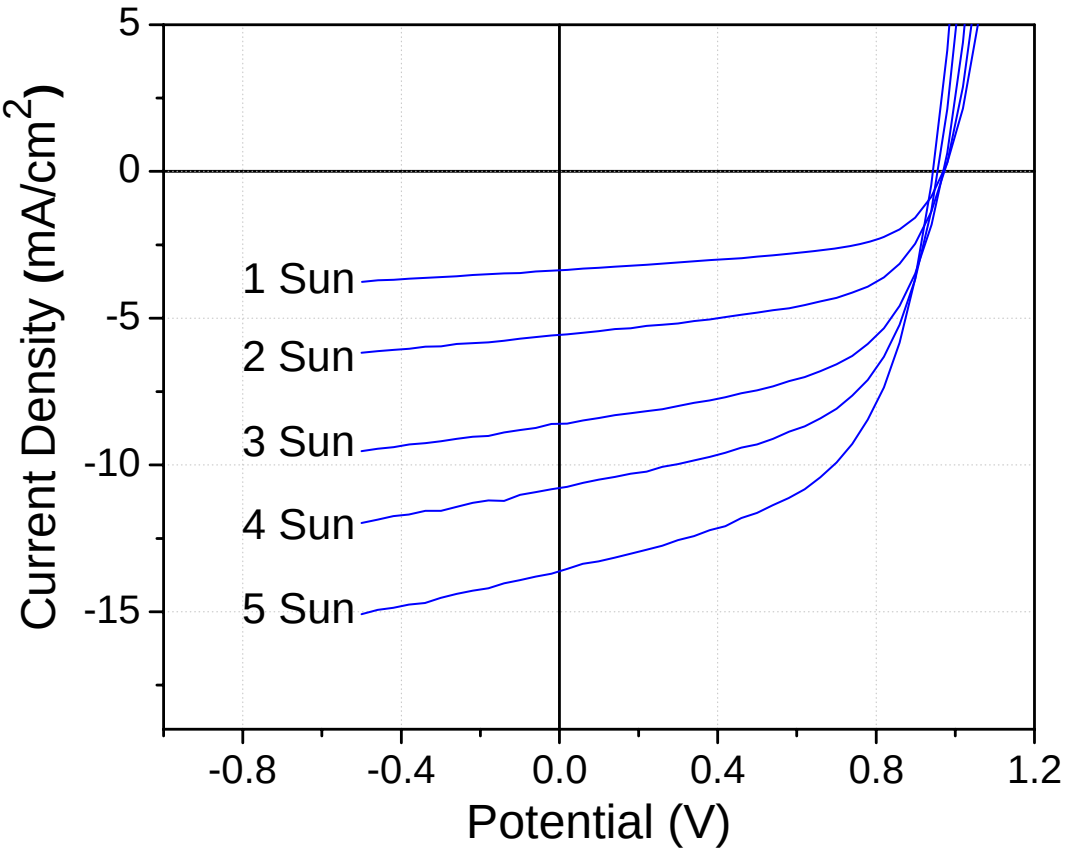


Table S1. Photovoltaic data for an ITO/SubPc (130 Å)/C_{60} (325 Å)/BCP (100 Å)/Al (1000 Å) device (SubPc4) under AM1.5G simulated solar illumination at 1-5 suns**.**

Power	J_{sc} (mA cm^{-2})	V_{oc} (V)	*FF*	η
1 Sun	3.4	0.97	0.58	2.1
2 Sun	5.6	0.97	0.57	1.7
3 Sun	8.6	0.97	0.56	1.6
4 Sun	10.8	0.96	0.55	1.6
5 Sun	13.6	0.94	0.54	1.5

Figure S2. *J-V* characteristics of an ITO/SubPc (130 Å)/C_{60} (325 Å)/BCP (100 Å)/Al (1000 Å) device (SubPc4) under AM1.5G simulated solar illumination at 1-5 suns**.**



References:

(1) Burrows, P. E.; Shen, Z.; Bulovic, V.; McCarty, D. M.; Forrest, S. R.; Cronin, J. A.; Thompson, M. E. J. Appl. Phys. 1996, 79, 7991-8006.