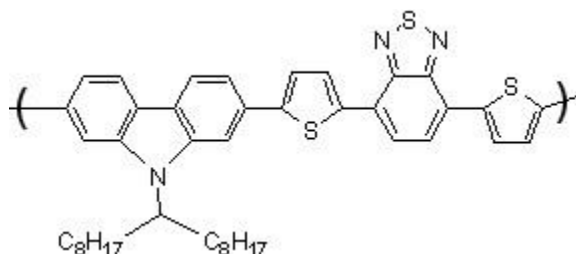
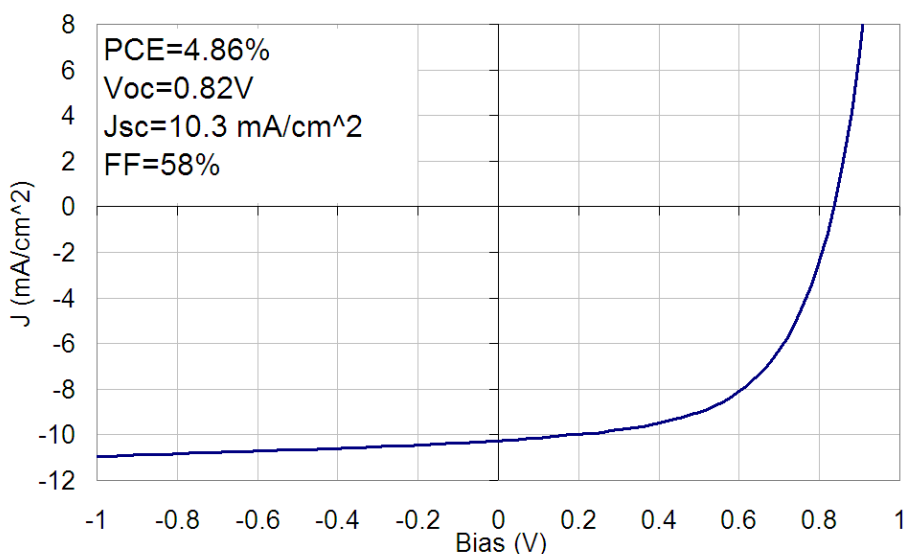


PCDTBT In Stock Now

For high performance organic photovoltaics with efficiencies over 5%
poly[N-9'-heptadecanyl-2,7-carbazole-alt-5,5-(4',7'-di-2-thienyl-2',1',3'-benzothiadiazole)]



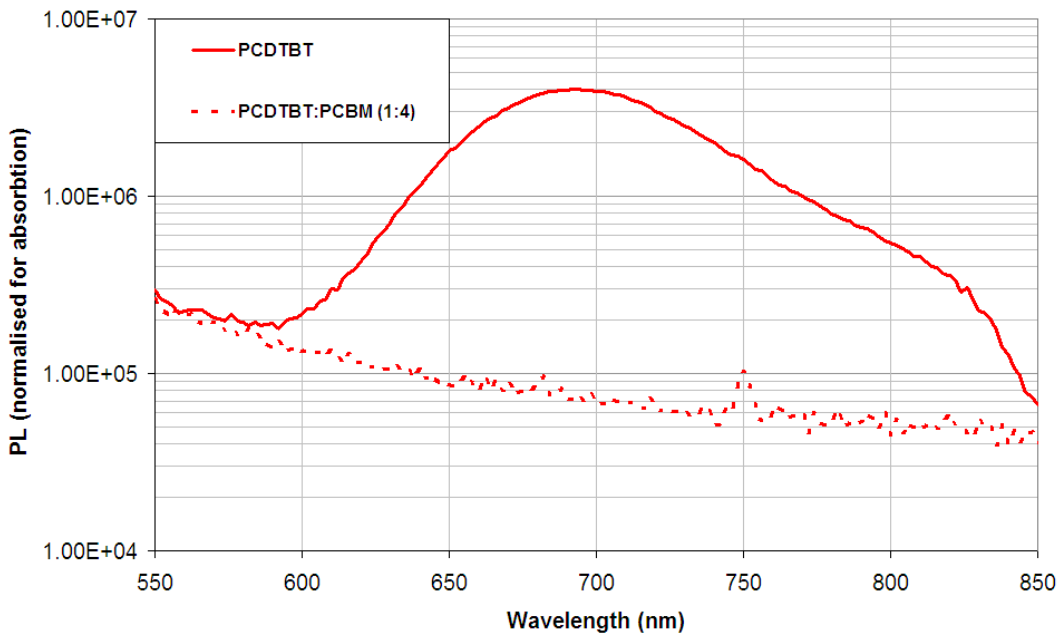
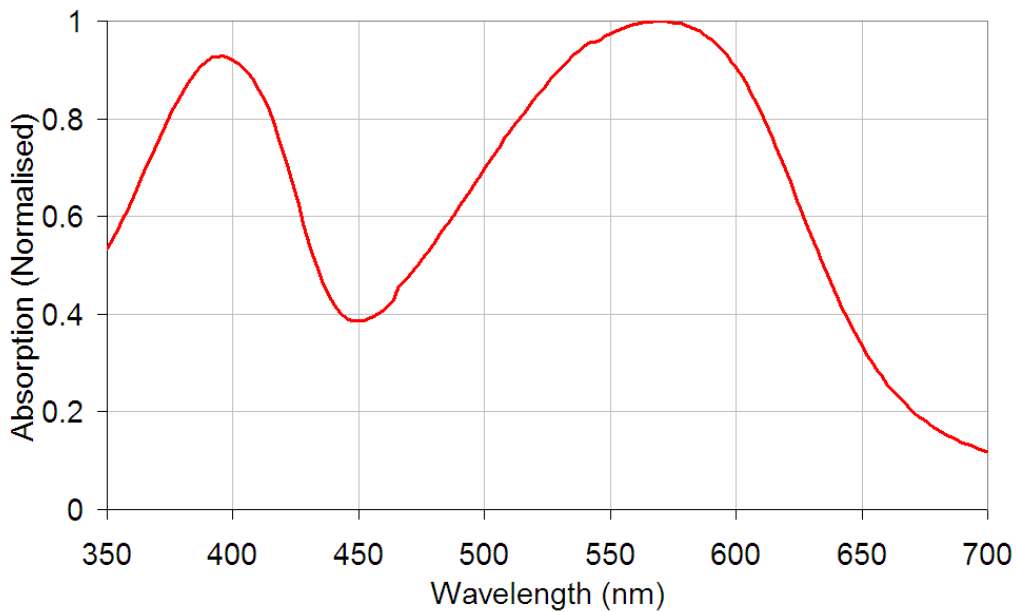
Ossila is pleased to announce that it now has PCDTBT in stock for delivery to research institutions in Europe and other territories outside of North America. In a standard organic photovoltaic configuration we have achieved an efficiency of **4.9%** (see overleaf for fabrication details) and using a metal oxide interfaces have achieved **5.1%** (publication pending, please contact us for details).



JV curve for champion device from Ossila's PCDTBT batch 001 using standard architecture of ITO/PEDOT:PSS/PCDTBT:PC₇₀BM/Ca/Al.

Polymer Properties

Batch#	001
Mn	16,700
Mw	33,600
PDI	2.01
HOMO/LUMO	-5.3 eV / -3.5 eV
Bandgap	~1.8 eV



Solution Details

Ossila's reference devices were made by dissolving PCDTBT (batch 001) at 4 mg/ml in anhydrous chloroform using a stir-bar and hotplate at 80°C before filtering through 5 µm and then 0.45 µm PTFE filters. This was then mixed with Ossila's dry 95% C70 PCBM powder in a 1:4 blend ratio to produce an overall concentration of 20 mg/ml.

The blend solution was heated with a stir-bar on a hotplate at 80°C for 60 hours before cooling to approximately room temperature over 5 minutes and filtering again with a 0.45 µm PTFE filter immediately prior to spinning at 3000 RPM to give a film of ~ 65 nm.

Note that the high molecular weight fraction in this batch enable highest performance but this means some insoluble components will be visible as aggregates in solution before filtering.

Device Structure

Glass/ITO/PEDOT:PSS/PCDTBT:PC₇₀BM/Ca/Al

Ossila's pre-patterned ITO substrates with 100 nm (20 Ohm/square) ITO were prepared by removing the protective photoresist by ultrasonication in a hot NaOH solution. After rinsing in DI water they were blown dry before spin-coating the hole transport layer (no further cleaning or surface treatment required).

PEDOT:PSS (AI4083 from Ossila) was diluted 2:1 with DI water and filtered through a 0.45 µm PVDF filter before spin coating at 5000 RPM in air to produce a layer ~20 nm thick). The coated substrates were then stored on a hotplate at 150 C before transfer into a glovebox and a further bake of 150 C for 10 mins to remove any residual moisture.

The active ink was spin cast and the cathode strip wiped clean before transfer to an evaporator where 5 nm of Ca followed by 100 nm of Al were deposited at 10^{-6} mbar. The substrates were then annealed at 80 C for 30 mins on a hotplate in the glovebox before protecting with the Ossila encapsulation system.

Measurement was performed under ambient conditions using a Newport 92251A AM1.5 100 mW/cm² solar simulator and NREL certified silicon reference cell.

Advantages

PCDTBT is one of the next generation donor materials being developed for organic photovoltaics to produce better efficiencies and lifetimes. The key properties of PCDTBT result from the lower HOMO and LUMO levels which lead to the advantages over standard organic photovoltaic materials (such as P3HT) of:

Increased open circuit voltage

Longer wavelength absorption

Lower concentration and material usage

Improved stability under ambient conditions

Ordering

Ossila's PCDTBT is in stock now for immediate delivery to European research institutes and can be dispatched upon receipt of a purchase order from your institution.

For current pricing please visit **Ossila.com** or email **Sales@Ossila.com**.

Typically sold in 100 mg quantities (for larger quantities please contact us). When used in solutions at the optimum concentration of 4 mg/ml this allows up to 25 ml of solution to be created from a single lot. Coating one of Ossila's standard sized ITO substrates requires ~25 μ l of solution. Therefore a 100 mg lot of PCDTBT will make around 500 devices assuming only 50% utilisation during filtering and solution preparation.

Caveat

To the best of our knowledge the technical information provided here is accurate. However, Ossila assume no liability for the accuracy of this information. The values provided here are typical at the time of manufacture and may vary over time and from batch to batch.