

Extremely Low Dark Current, Polymer Donor PD1300T1 For SWIR-OPD



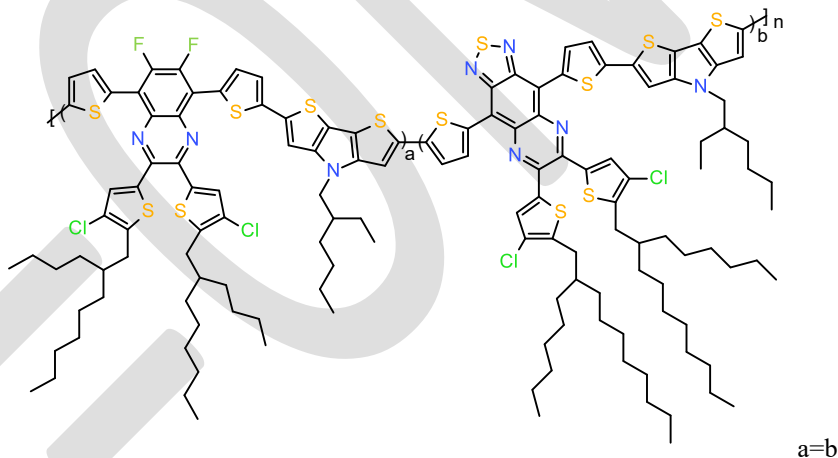
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Organic Nano Electronic (ONE=1) Materials for these who understand quality

Technical Data Sheet

1M Material:	PD1300T1
Common Name:	PD-1300T1, SWIR-OPD-1300T1, PQPr-55
Potential Applications:	Polymeric donor for SWIR-OPD with peak sensitivity approaches 1300nm, extremely low dark current and high detectivity.
Chemical Structure:	



Appearance:	Deep brown to black solid
Molecular Weight:	Mw > 100K, PDI ~ 3 (GPC, PS standards)
Energy Level:	LUMO=-4.16eV; HOMO=-4.91eV; Eg=0.75eV.
Purity:	99% (basing on NMR of monomers)
Shelf life:	6 months (unopened)
Safety:	Please consult Material Safe Data Sheet (MSDS) before using

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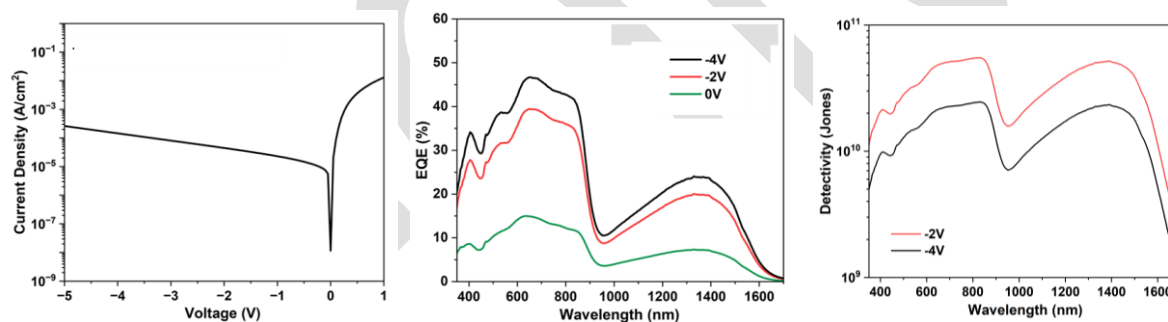
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Suggested device fabrication procedure, example and reference only

Glass/ITO/AZO(40nm)/PD-1300-T1:N1(140nm)/MoO_x(8nm)/Ag(100nm):

1. Prepare the active ink PD1300T1(donor):N1 (acceptor)=1:2; total 30mg/mL in o-xylene.
Best storage in nitrogen otherwise dry box (relative humidity <20% is recommended)
If the ink has been left standing on shelf for a while (>60min), reheating is recommended to ensure the uniformity of the ink, else the viscosity of the ink will increase due to gelation.
Reheating ink at 100 °C for 30min under nitrogen protection and allow ink to cool down.
2. Deposit AZO(N-21x-Flex) ink on ITO substrate by spin-coating at 3000rpm for 30s. Followed by 50 mins annealing at 200 °C in the air to form ~ 40nm electron transporting layer.
3. Place AZO/ITO substrate on a spin-coater and flood with ink, then spin at 900-1200 rpm for 50s, and finish coating with 5-7 sec at 3000 rpm to throw off any ink drops that accumulated in the corners of the substrate; anneal the as-cast film at 100 °C for 5 min to have a thickness of ~140nm.
4. Deposit MoO_x (8 nm) and Ag (100 nm) under a vacuum pressure below 1×10^{-6} torr.
Alternatively, ZnO can replace AZO to have comparable performance.

Typical performance:



J_{dark} (A/cm ²)		EQE (%) at 1300nm		D^* (Jones) at 1300nm	
-2V	-4V	-2V	-4V	-2V	-4V
6.7×10^{-5}	2.5×10^{-4}	20.1	24.1	4.6×10^{10}	2.8×10^{10}

Note: D^* : the shot noise-limited detectivity

References: *Adv. Optical Mater.* **2025**, e01536 (DOI: 10.1002/adom.202501536)

Remarks: PD1300T1 is patented and produced by Raynergy Tek Incorporation. 1-Material Inc has been granted the exclusive right to provide these materials in North America under the trademark of 1-Material.

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