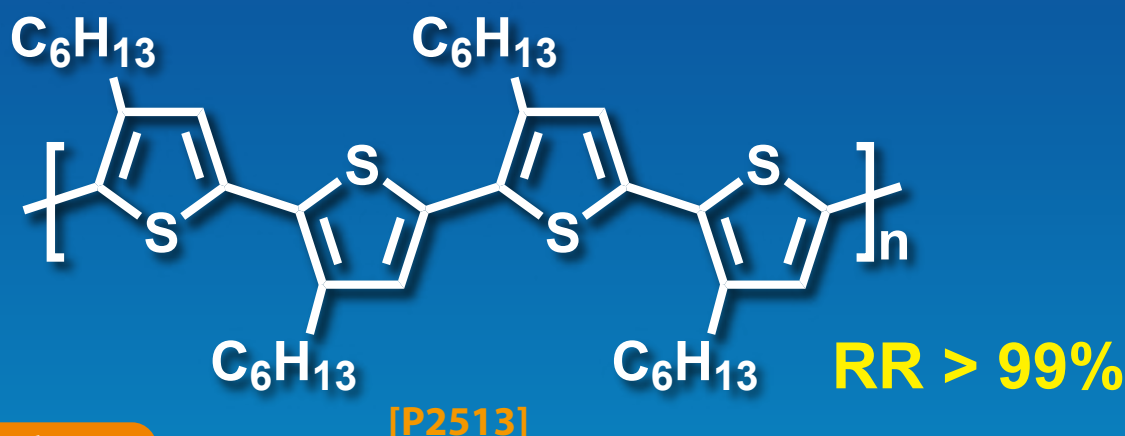


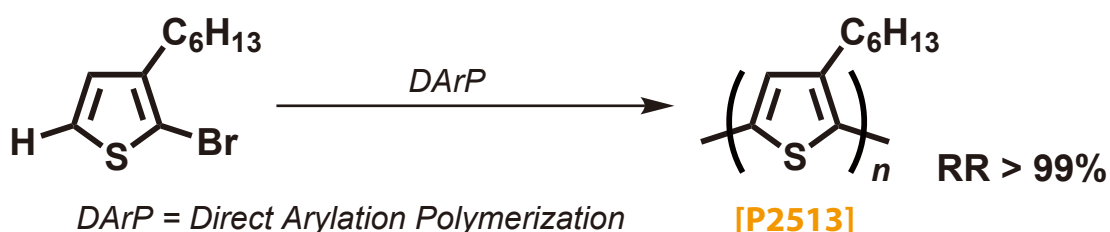
Organic Semiconducting Polymer Highly Regioregular P3HT



Advantages

- High regioregularity (RR) > 99%
- Number average molecular weight: $M_n = 36\text{k}-44\text{k}$, PDI < 2.5
- Electronic material grade: High purity, low metal (Pd < 100 ppm)
- Highly soluble, excellent to film

Synthesis of P3HT by direct arylation polymerization (DARp) and physical properties^{1,2)}



The data is extracted from Ref. 2)

Method	M_n (PDI)	RR (%)	T_m (°C)	μ_{\max} (cm ² /V·s)
DARp	33,000 (1.8)	99.5	237	0.19
Rieke	25,000 (1.3)	95.5	224	0.02
GRIM	88,000 (1.5)	98.0	234	0.11

1) Q. Wang, R. Takita, Y. Kikuzaki, F. Ozawa, *J. Am. Chem. Soc.* **2010**, *132*, 11420.

2) J.-R. Pouliot, M. Wakioka, F. Ozawa, Y. Li, M. Leclerc, *Macromol. Chem. Phys.* **2016**, *217*, 1493.

Poly(3-hexylthiophene-2,5-diyl) (Mn.=ca.40,000, RR >99%) (regioregular)

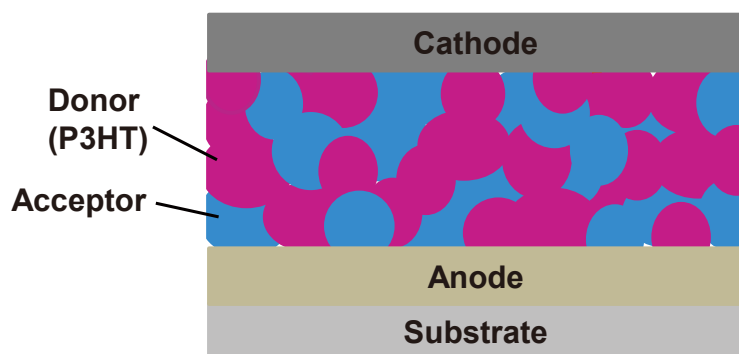
100mg / 500mg **[P2513]**

This material was produced by collaboration with Prof. Fumiyouki Ozawa at Institute for Chemical Research, Kyoto University.

Organic Semiconducting Polymer: Highly Regioregular P3HT

Applications

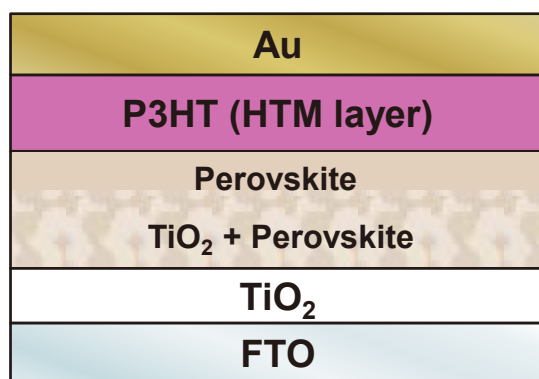
Organic Photovoltaics (OPV)¹⁾



P3HT: Donor material

Usable for a solution processable OPV device
Fabricates a bulk heterojunction (BHJ) with a highly soluble donor and acceptor

Perovskite Solar Cell (PSC)²⁾



P3HT: Hole transport material (HTM)

Usable for a solution processable PSC device
Realizes high power conversion efficiency

Organic Transistor (OFET)³⁾



P3HT: p-Type semiconductor

Usable for a solution processable OFET device

- 1) OPV: E. L. Lim, C. C. Yap, M. A. M. Teridi, C. H. Teh, A. R. M. Yusoff, M. H. H. Jumali, *Org. Electron.* **2016**, 36, 12; A. Marrocchi, D. Lanari, A. Facchetti, L. Vaccaro, *Energy Environ. Sci.* **2012**, 5, 8457.
2) PSC: L. Calió, S. Kazim, M. Grätzel, S. Ahmad, *Angew. Chem. Int. Ed.* **2016**, 55, 14522.
3) OFET: H. Sirringhaus, *Adv. Mater.* **2014**, 26, 1319.

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