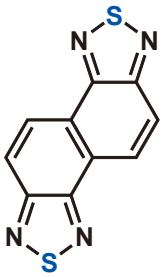
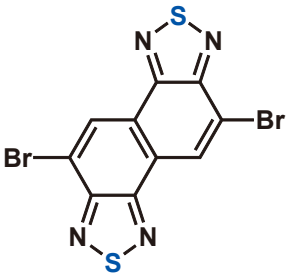
MATERIALS

Acceptor-type Organic Semiconductor Building Blocks NTz and NOz

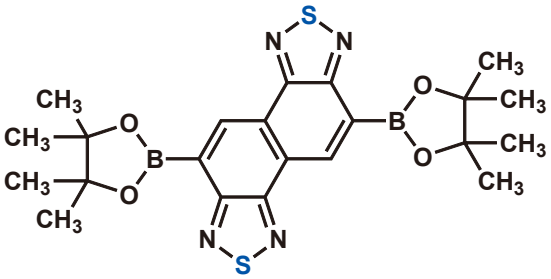
Naphthobisthiadiazoles (NTz)



NTz
200mg
[N1105]

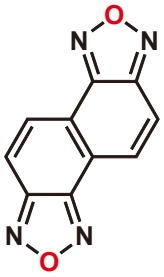


Br2-NTz
100mg
[D5288]

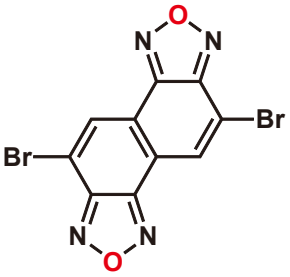


Bpin2-NTz
100mg
[B5470]

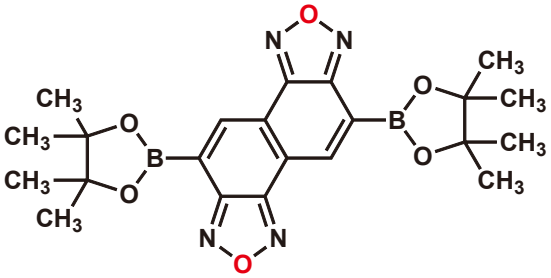
Naphthobisoxadiazoles (NOz)



NOz
200mg
[N1137]



Br2-NOz
100mg
[D5496]

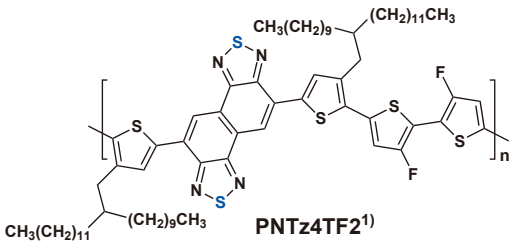


Bpin2-NOz
100mg
[B5774]

Applications

High-performance polymers for organic photovoltaics (OPV)

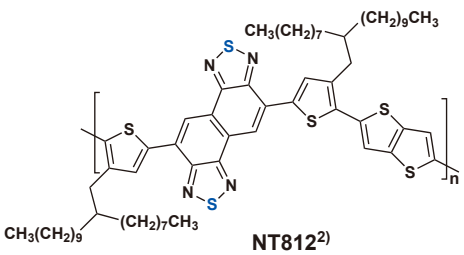
PCE = 10.5%
(ITO/ZnO/PNTz4TF2:$PC_{71}BM$(1:2 w/w)/MoO_x/Ag)
$\mu_{h,SCLC}$ = 1.5×10^{-3} cm^2/Vs, $\mu_{e,SCLC}$ = 2.1×10^{-3} cm^2/Vs



PNTz4TF2[1)]

Reference
1) K. Kawashima, T. Fukuhara, Y. Suda, Y. Suzuki, T. Koganezawa, H. Yoshida, H, Ohkita, I. Osaka, K. Takimiya, *J. Am. Chem. Soc.* **2016**, *138*, 10265.
DOI: https://doi.org/10.1021/jacs.6b05418

PCE = 10.3%
(ITO/PEDOT:PSS/NT812:$PC_{71}BM$(1:1.5 w/w)/PFN-Br/Ag)
$\mu_{h,SCLC}$ = 2.7×10^{-2} cm^2/Vs



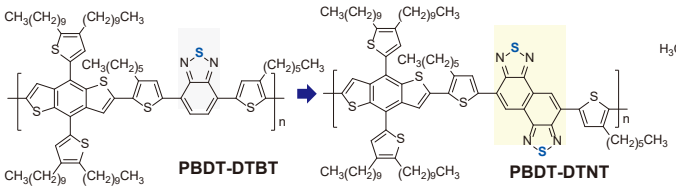
NT812[2)]

Reference
2) Y. Jin, Z. Chen, S. Dong, N. Zheng, L. Ying, X. F. Jiang, F. Liu, F. Huang, Y. Cao, *Adv. Mater.* **2016**, *28*, 9811.
DOI: https://doi.org/10.1002/adma.201603178

These products were commercialized under the technical tie-up with Sankyo Kasei Co., Ltd

Acceptor-type Organic Semiconductor Building Blocks: NTz and NOz

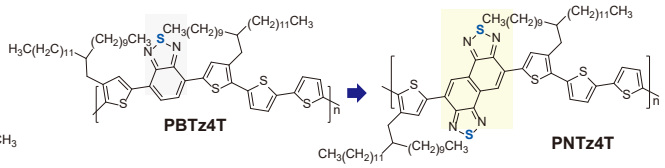
• Functional differences between benzothiadiazole and NTz analogs



	PCE (%)	$\mu_{hmax,\ SCLC}$ /cm^{2}V^{-1}s^{-1}	E_{HOMO} /eV	E_{LUMO} /eV
PBDT-DTNT	**6.00**	**3.0×10^{-5}**	-5.19	-3.26
PBDT-DTBT	2.11	4.4×10^{-6}	-5.26	-3.10

Reference

3) M. Wang, X. Hu, P. Liu, W. Li, X. Gong, F. Huang, Y. Cao, *J. Am. Chem. Soc.* **2011**, *133*, 9638. DOI: https://doi.org/10.1021/ja201131h

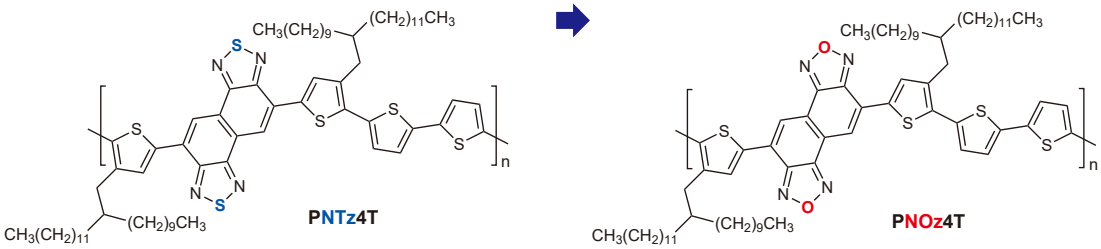


	PCE (%)	$\mu_{hmax,\ FET}$ /cm^{2}V^{-1}s^{-1}	E_{HOMO} /eV	E_{LUMO} /eV
PNTz4T	**6.3**	**5.6×10^{-1}**	-5.16	-3.77
PBTz4T	2.6	7.4×10^{-2}	-5.07	-3.53

Reference

4) I. Osaka, M. Shimawaki, H. Mori, I. Doi, E. Miyazaki, T. Koganezawa, K. Takimiya, *J. Am. Chem. Soc.* **2012**, *134*, 3498. DOI: https://doi.org/10.1021/ja210687r

• Functional differences between NTz and NOz analogs



	PCE (%)	E_{loss} /eV	$\mu_{h,\ FET}$ /cm^{2}V^{-1}s^{-1} on $CF_3(CF_2)_7CH_2CH_2Si(OEt)_3$-treated substrates	$\mu_{h,\ FET}$ /cm^{2}V^{-1}s^{-1} on $CH_3(CH_2)_{17}Si(OEt)_3$-treated substrates	$\mu_{e,\ FET}$ /cm^{2}V^{-1}s^{-1} on $CH_3(CH_2)_{17}Si(OEt)_3$-treated substrates	E_{HOMO} /eV	E_{LUMO} /eV
PNOz4T	8.9	0.52-0.56	5.5×10^{-1}	2.7×10^{-1}	1.7×10^{-1}	-5.48	-3.65
PNTz4T	10.1	0.82-0.85	2.3×10^{-1}	1.5×10^{-1}	-	-5.14	-3.46

References

5) K. Kawashima, I. Osaka, K. Takimiya, *Chem. Mater.* **2015**, *27*, 6558. DOI: https://doi.org/10.1021/acs.chemmater.5b03124
6) K. Kawashima, Y. Tamai, H. Ohkita, I. Osaka, K. Takimiya, *Nat. Commun.* **2015**, *6*, 10085. DOI: https://doi.org/10.1038/ncomms10085

Related Products

2,1,3-Benzoxadiazole	1g / 5g [B4473]
4,7-Dibromo-2,1,3-benzothiadiazol	1g / 5g / 25g [D3842]
2,1,3-Benzothiadiazole-4,7-diboronic Acid Bis(pinacol) Ester	1g / 5g [B3573]

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