MATERIALS

Solar Cell Materials

Perovskite Solar Cell (PSC) Materials

Organic Photovoltaics (OPV) Materials

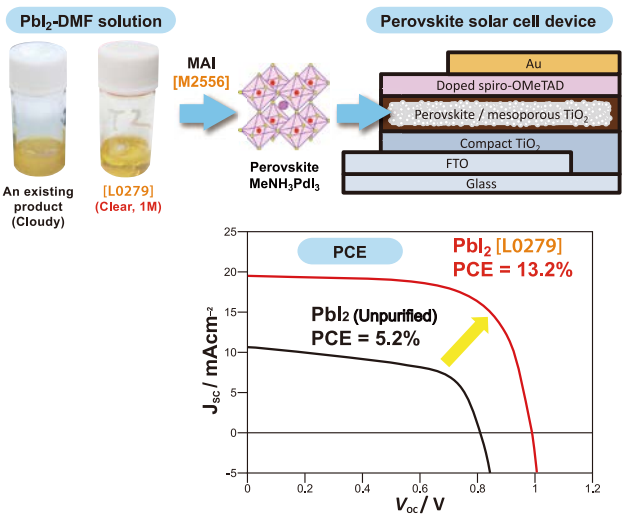
Dye-Sensitized Solar Cell (DSSC) Materials

Solar Cell Materials

Sunlight is one of the renewable energy sources that can globally contribute to environmental and energy solutions in the 21st century. In order to use sunlight as efficiently as possible, low cost and efficient solar cells have been vigorously developed for practical use. As is generally known, practical silicon-based solar cells involve high manufacturing cost, as well as any other inorganic-based solar cells. On the basis of the cost problem, we have developed new solar cells based on organic and organic-inorganic hybrid materials.

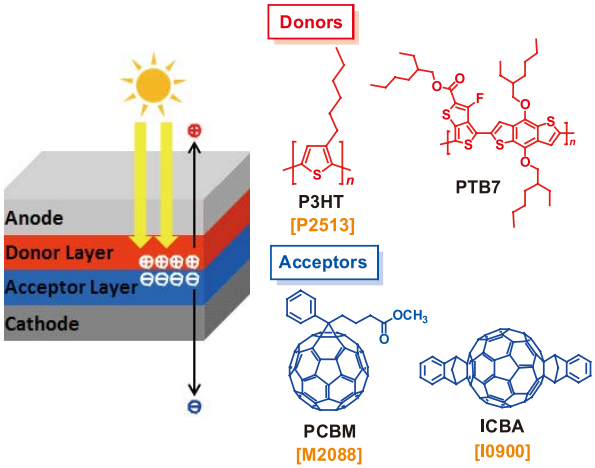
1. Perovskite Solar Cell (PSC) Materials

A perovskite solar cell, that was first reported by Miyasaka *et al.* in 2009, has recently received much attention.[1] The organic-inorganic perovskite, RNH_3PbX_3 (X = Cl, Br, I; R = Me, NH=CH, etc.), can function as a light absorption layer. Since 2012, power conversion efficiency (PCE) of the perovskite solar cell has been drastically improved and it has reached >15% better than those of OPV and DSSC.[2-5] A device of the perovskite solar cell is solution-processible for fabrication at low cost. The organic-inorganic perovskites RNH_3PbX_3 are easily prepared from HX salts of organic amines and lead halides. A modification of the halide X in the $(MeNH_3)PbX_3$ can control the range of absorption wavelength.[6] The perovskite compound with X = Br is useful for light absorption in shorter wavelengths and the compound with X = I is relatively useful for that in longer wavelengths. Wakamiya *et al.* reported that use of highly dried lead(II) iodide is a key to fabricate efficient perovskite solar cell devices (PCE > 10%) with high reproducibility.[7,8] Carrier behavior in the perovskite layer is different from that in OPV, thus there are free carriers in which electrons and holes can be movable freely.[9] According to the reason, the perovskite layer can transport both electron and hole carriers without recombination.



2. Organic Photovoltaics (OPV) Materials

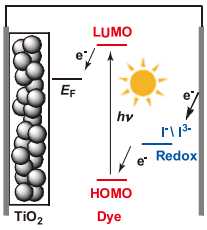
A prototype of organic photovoltaics (OPV) was reported by Tang *et al.* in 1986.[10] In order to fabricate an OPV device, we can use highly productive methods such as printing and roll-to-roll methods. The OPV device usually requires bulk heterojunctions (BHJ) which can be fabricated by mixing an electron-donor (*p*-type semiconductor) and electron-acceptor (*n*-type semiconductor).[11] The former material involves a π-conjugated polymer and a small molecule semiconductor, and the latter material is normally a fullerene derivative. PCBM, that is a solubility-enhanced fullerene, efficiently provides a bulk heterojunction.[12] ICBM gives a high open-circuit voltage because it has a higher energy LUMO than that of PCBM.[13] A C_{70} derivative usually gives higher cell efficiency compared with that of the corresponding C_{60} one, because the C_{70} derivative absorbs light better than the C_{60}.[14] We can introduce an acceptor component into the structure of a *p*-type semiconducting polymer to form a donor-acceptor (DA-type) polymer, that shows light absorption in the long wavelength area based on a charge transfer.[15]

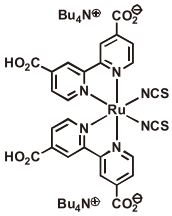


3. Dye-Sensitized Solar Cell (DSSC) Materials

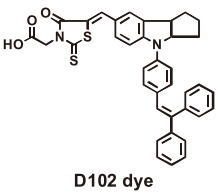
Grätzel *et al.* first developed a dye-sensitized solar cell (DSSC) in 1991.[16] The DSSC is a liquid-type device that involves nanoporous titanium oxide (TiO_2) as a semiconducting electrode, organic dye-sensitizer and an electrolyte solution containing a redox component. This is expected to be a low cost solar cell, because there is a simple device structure compared with other solar cells.[17] The DSSC is usable under conditions with weak light. Thus, it is expected that the DSSC may be installed in a room. A ruthenium complex with a bipyridine ligand is one popular organic dye for solar cells.[18] In the polypyridine ligand of

the ruthenium complex, we can introduce some carboxyl or phosphonic acid groups forming a linkage with TiO_2. In addition, metal-free organic dyes (eg. D-102, D-131 and D-358) were also developed, because they do not contain any expensive ruthenium atoms.[19,20] Recently, efficient green-colored zinc-porphyrin dyes were developed for DSSC showing more than 10% of PCE.[21,22] Furthermore, efficient blue-colored metal-free organic dyes having a diketopyrrolopyrrole structure were developed for DSSC (PCE > 10%).[23]





N719 dye
[B3514]



D102 dye
[D4430]

References

1) A. Kojima, K. Teshima, Y. Shirai, T. Miyasaka, *J. Am. Chem. Soc.* **2009**, *131*, 6050.
2) J. Burschka, N. Pellet, S.-J. Moon, R. Humphry-Baker, P. Gao, M. K. Nazeeruddin, M. Grätzel, *Nature* **2013**, *499*, 316.
3) M. Liu, M. B. Johnston, H. J. Snaith, *Nature* **2013**, *501*, 395.
4) H. Zhou, Q. Chen, G. Li, S. Luo, T.-B. Song, H.-S. Duan, Z. Hong, J. You, Y. Liu, Y. Yang, *Science* **2014**, *345*, 542.
5) W. S. Yang, J. H. Noh, N. J. Jeon, Y. C. Kim, S. Ryu, J. Seo, S. I. Seok, *Science* **2015**, *348*, 1234.
6) J. H. Noh, S. H. Im, J. H. Heo, T. N. Mandal, S. I. Seok, *Nano Lett.* **2013**, *13*, 1764.
7) A. Wakamiya, M. Endo, T. Sasamori, N. Tokitoh, Y. Ogomi, S. Hayase, Y. Murata, *Chem. Lett.* **2014**, *43*, 711.
8) A. Wakamiya, M. Endo, Y. Murata, Patent Pending, Appl. No. JP2014-008540.
9) Y. Yamada, T. Nakamura, M. Endo, A. Wakamiya, Y. Kanemitsu, *J. Am. Chem. Soc.* **2014**, *136*, 11610.
10) C. W. Tang, *Appl. Phys. Lett.* **1986**, *48*, 183.
11) C. J. Brabec, G. Zerza, G. Cerullo, S. De Silvestri, S. Luzzatti, J. C. Hummelen, N. S. Sariciftci, *Chem. Phys. Lett.* **2001**, *340*, 232.
12) J. C. Hummelen, B. W. Knight, F. LePeq, F. Wudl, J. Yao, C. L. Wilkins, *J. Org. Chem.* **1995**, *60*, 532.
13) Y. He, H.-Y. Chen, J. Hou, Y. Li, *J. Am. Chem. Soc.* **2010**, *132*, 1377.
14) M. M. Wienk, J. M. Kroon, W. J. H. Verhees, J. Knol, J. C. Hummelen, P. A. van Hal, R. A. J. Janssen, *Angew. Chem., Int. Ed.* **2003**, *42*, 3371.
15) S. H. Park, A. Roy, S. Beaupré, S. Cho, N. Coates, J. S. Moon, D. Moses, M. Leclerc, K. Lee, A. J. Heeger, *Nat. Photonics* **2009**, *3*, 297.
16) B. O'Regan, M. Grätzel, *Nature* **1991**, *353*, 737.
17) M. K. Nazeeruddin, P. Pechy, M.Grätzel, *Chem. Commum.* **1997**, 1705.
18) Review: M. Grätzel, *Inorg. Chem.* **2005**, *44*, 6841.
19) W. H. Howie, F. Claeyssens, H. Miura, L. M. Peter, *J. Am. Chem. Soc.* **2008**, *130*, 1367.
20) R. Yoneya Ogura, S. Nakane, M. Morooka, M. Orihashi, Y. Suzuki, K. Noda, *Appl. Phys. Lett.* **2009**, *94*, 073308/1.
21) C.-P. Hsieh, H.-P. Lu, C.-L. Chiu, C.-W. Lee, S.-H. Chuang, C.-L. Mai, W.-N. Yen, S.-J. Hsu, E. W.-G. Diau, C.-Y. Yeh, *J. Mater. Chem.* **2010**, *20*, 1127.
22) A. Yella, H.-W. Lee, H. N. Tsao, C. Yi, A. K. Chandiran, M. K. Nazeeruddin, E. W.-G. Diau, C.-Y. Yeh, S. M Zakeeruddin, M. Grätzel, *Science*, **2011**, *334*, 629.
23) J.-H. Yum, T. W. Holcombe, Y. Kim, K. Rakstys, T. Moehl, J. Teuscher, J. H. Delcamp, M. K. Nazeeruddin, M. Grätzel, *Sci. Rep.* **2013**, *3*, 2446.

Perovskite Solar Cell (PSC) Materials

Lead Halides

L0279 1g 5g 25g 100g 1kg

PbI_2

Lead(II) Iodide
(99.99%, trace metals basis)
[for Perovskite precursor]
CAS RN: 10101-63-0

L0288 1g 5g 25g

$PbBr_2$

Lead(II) Bromide
[for Perovskite precursor]
CAS RN: 10031-22-8

L0346 1g 5g

$PbBr_2$

Lead(II) Bromide (Low water content) [for Perovskite precursor]
CAS RN: 10031-22-8

L0291 1g 5g

$PbCl_2$

Lead(II) Chloride
(purified by sublimation)
[for Perovskite precursor]
CAS RN: 7758-95-4

L0292 1g 5g 25g

$PbCl_2$

Lead(II) Chloride
[for Perovskite precursor]
CAS RN: 7758-95-4

C3570 1g 5g

$CsPbI_3$

Cesium Lead Triiodide
(Low water content)
CAS RN: 18041-25-3

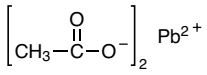
C3569 1g 5g

$CsPbBr_3$

Cesium Lead Tribromide
(Low water content)
CAS RN: 15243-48-8

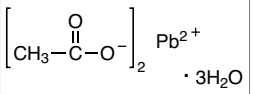
Other Lead Compounds

L0315 1g 5g 25g



Lead(II) Acetate
[for Perovskite precursor]
CAS RN: 301-04-2

L0330 25g 100g



Lead(II) Acetate Trihydrate
CAS RN: 6080-56-4

Bismuth Halides

B5787 5g 25g

BiI_3

Bismuth(III) Iodide
Anhydrous
CAS RN: 7787-64-6

Tin Halides

T3449 1g 5g

SnI_2

Tin(II) Iodide
[for Perovskite precursor]
CAS RN: 10294-70-9

T3573 1g 5g

$SnBr_2$

Tin(II) Bromide
CAS RN: 10031-24-0

T3570 1g 5g

$SnCl_2$

Tin(II) Chloride
CAS RN: 7772-99-8

Cesium Halides

C2205 25g

CsI

Cesium Iodide
CAS RN: 7789-17-5

C2202 25g 100g

CsBr

Cesium Bromide
CAS RN: 7787-69-1

C2203 25g 100g

CsCl

Cesium Chloride
CAS RN: 7647-17-8

Organic Onium Salts

Iodide Salts

M2556 1g 5g 25g 100g

$CH_3NH_2 \cdot HI$

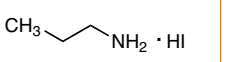
Methylamine Hydroiodide
(Low water content)
CAS RN: 14965-49-2

E1045 1g 5g

$CH_3CH_2NH_2 \cdot HI$

Ethylamine Hydroiodide
CAS RN: 506-58-1

P2212 1g 5g



Propylamine Hydroiodide
CAS RN: 14488-45-0

B4433 1g 5g

$CH_3(CH_2)_3NH_2 \cdot HI$

Butylamine Hydroiodide
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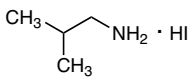
I0935 1g 5g



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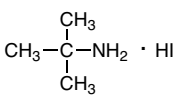

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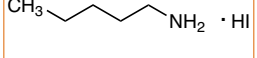

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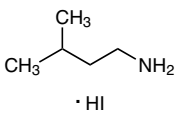

Isopentylamine Hydroiodide

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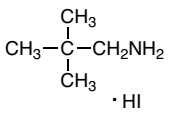

Neopentylamine Hydroiodide

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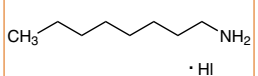

n-Octylammonium Iodide
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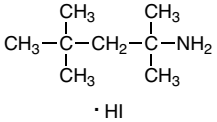

tert-Octylamine Hydroiodide

D5538 1g 5g

$CH_3(CH_2)_{11}NH_2 \cdot HI$

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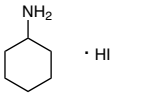
C3532 1g 5g



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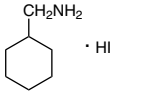

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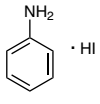

Aniline Hydroiodide
CAS RN: 45497-73-2

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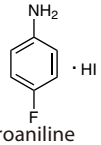
F1273 1g 5g



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Benzylamine Hydroiodide
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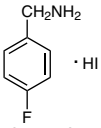

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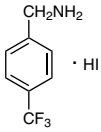

4-(Trifluoromethyl)-benzylamine Hydroiodide

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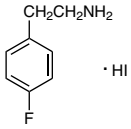

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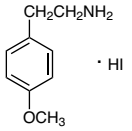
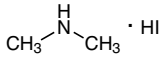


2-(4-Methoxyphenyl)-ethylamine Hydroiodide

D4555 1g 5g



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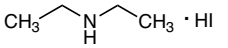
D4643 1g 5g



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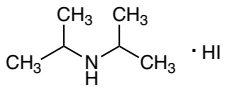

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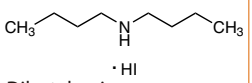

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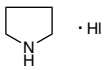

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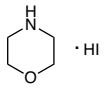

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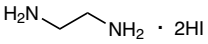
E1222 1g 5g



Ethylenediamine Dihydroiodide
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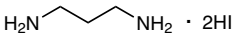
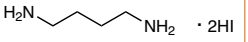
D5091 1g 5g



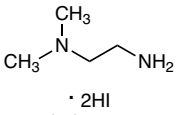
1,3-Diaminopropane Dihydroiodide
CAS RN: 120675-53-8

D5686 1g 5g



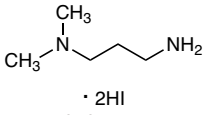
1,4-Diaminobutane Dihydroiodide
CAS RN: 916849-52-0

D5616 1g 5g



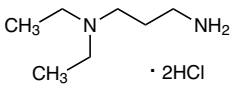
2-(Dimethylamino)-ethylamine Dihydroiodide
CAS RN: 244234-52-4

D5619 1g 5g



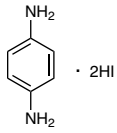
3-(Dimethylamino)-propylamine Dihydroiodide

D5861 5g



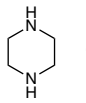
3-(Dimethylamino)-propylamine Dihydroiodide
CAS RN: 99310-71-1

P2389 1g



1,4-Phenylenediamine Dihydriodide
CAS RN: 116469-02-4

P2492 1g 5g

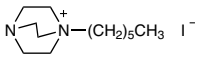


Piperazine Dihydriodide
CAS RN: 58464-47-4

D5252 1g 5g

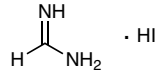
1,4-Diazabicyclo[2.2.2]-octane Dihydriodide
CAS RN: 33322-06-4

H1759 5g



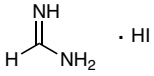
1-Hexyl-1,4-diazabicyclo[2.2.2]octan-1-ium Iodide
CAS RN: 1009321-13-4

F0974 1g 5g 25g



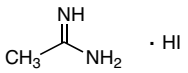
Formamidine Hydroiodide
(Low water content)
CAS RN: 879643-71-7

F1263 1g 5g 25g



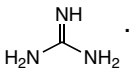
Formamidine Hydroiodide
(99.99%, trace metals basis)
CAS RN: 879643-71-7

A2902 1g 5g



Acetamidine Hydroiodide
(Low water content)
CAS RN: 1452099-14-7

G0450 1g 5g



Guanidine Hydroiodide
CAS RN: 19227-70-4

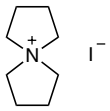
I0970 1g 5g

Imidazole Hydroiodide
(Low water content)
CAS RN: 68007-08-9

P2672 5g

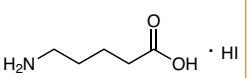
Pyridine Hydroiodide
CAS RN: 18820-83-2

A3093 1g 5g



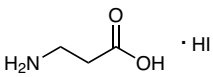
5-Azoniaspiro[4.4]nonane Iodide
CAS RN: 45650-35-9

A2984 1g 5g



5-Aminovaleric Acid Hydroiodide
(Low water content)
CAS RN: 1705581-28-7

A3112 1g 5g



β-Alanine Hydroiodide
(Low water content)
CAS RN: 2096495-59-7

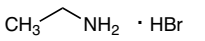
Bromide Salts

M2589 1g 5g 25g

$CH_3NH_2 \cdot HBr$

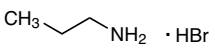
Methylamine Hydrobromide
(Low water content)
CAS RN: 6876-37-5

E0056 25g 500g



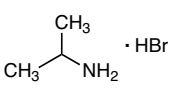
Ethylamine Hydrobromide
CAS RN: 593-55-5

P2502 1g 5g



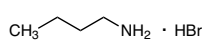
Propylamine Hydrobromide
CAS RN: 4905-83-3

I1041 1g 5g



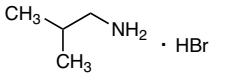
Isopropylamine Hydrobromide
CAS RN: 29552-58-7

B5186 1g 5g



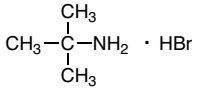
Butylamine Hydrobromide
CAS RN: 15567-09-6

I1007 1g 5g



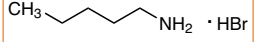
Isobutylamine Hydrobromide
CAS RN: 74098-36-5

B5187 1g 5g



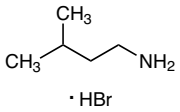
tert-Butylamine Hydrobromide
CAS RN: 60469-70-7

P2739 1g 5g



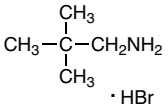
Pentylamine Hydrobromide
CAS RN: 7334-94-3

I1094 1g 5g



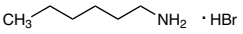
Isopentylamine Hydrobromide

N1156 1g 5g



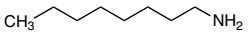
Neopentylamine Hydrobromide

H1678 1g 5g



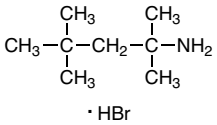
Hexylamine Hydrobromide
CAS RN: 7334-95-4

O0442 1g 5g



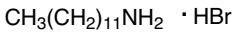
n-Octylamine Hydrobromide
CAS RN: 14846-47-0

T3783 1g 5g



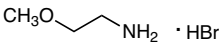
tert-Octylamine Hydrobromide
CAS RN: 1093859-61-0

D5537 1g 5g



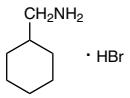
Dodecylamine Hydrobromide
CAS RN: 26204-55-7

M3287 1g 5g



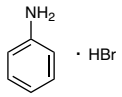
2-Methoxyethylamine Hydrobromide
CAS RN: 663941-77-3

C3531 1g 5g



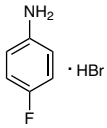
Cyclohexanemethylamine Hydrobromide

A2985 1g 5g



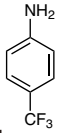
Aniline Hydrobromide
CAS RN: 542-11-0

F1272 5g 25g



4-Fluoroaniline Hydrobromide
CAS RN: 85734-18-5

T3834 1g 5g

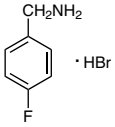


4-(Trifluoromethyl)aniline Hydrobromide
CAS RN: 148819-81-2

B5185 1g 5g

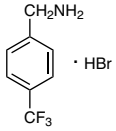
Benzylamine Hydrobromide
CAS RN: 37488-40-7

F1227 1g 5g



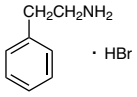
4-Fluorobenzylamine Hydrobromide
CAS RN: 2270172-94-4

T3837 1g 5g



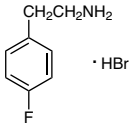
4-(Trifluoromethyl)-benzylamine Hydrobromide

P2388 1g 5g



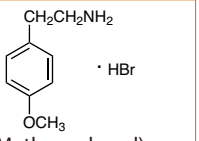
2-Phenylethylamine Hydrobromide
CAS RN: 53916-94-2

F1229 1g 5g



4-Fluorophenethylamine Hydrobromide
CAS RN: 1807536-06-6

M3239 1g 5g

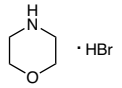


2-(4-Methoxyphenyl)-ethylamine Hydrobromide

P2484 1g 5g

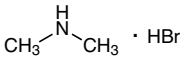
Pyrrolidine Hydrobromide
CAS RN: 55810-80-5

M3285 5g 25g



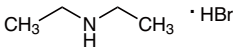
Morpholine Hydrobromide
CAS RN: 6377-82-8

D5092 1g 5g



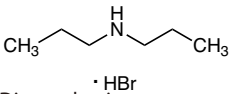
Dimethylamine Hydrobromide
CAS RN: 6912-12-5

D4667 1g 5g



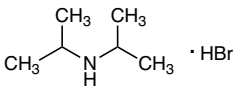
Diethylamine Hydrobromide
CAS RN: 6274-12-0

D5853 5g



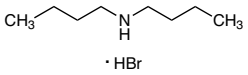
Dipropylamine Hydrobromide
CAS RN: 7334-96-5

D5768 5g



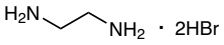
Diisopropylamine Hydrobromide
CAS RN: 30321-74-5

D5857 5g



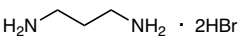
Dibutylamine Hydrobromide
CAS RN: 10435-44-6

E1221 1g 5g



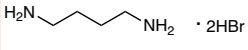
Ethylenediamine Dihydrobromide
CAS RN: 624-59-9

D5090 1g 5g



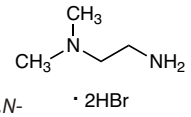
1,3-Diaminopropane Dihydrobromide
CAS RN: 18773-03-0

D5685 1g 5g



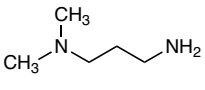
1,4-Diaminobutane Dihydrobromide
CAS RN: 18773-04-1

D5615 1g 5g



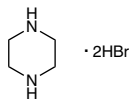
N,N-Dimethylethylenediamine Dihydrobromide
CAS RN: 1245570-04-0

D5618 1g 5g



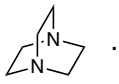
3-(Dimethylamino)-propylamine Dihydrobromide

P2490 1g 5g



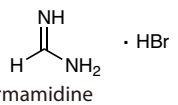
Piperazine Dihydrobromide
CAS RN: 59813-05-7

D5250 1g 5g



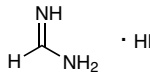
1,4-Diazabicyclo[2.2.2]-octane Dihydrobromide
CAS RN: 54581-69-0

F0973 1g 5g 25g



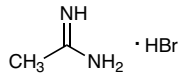
Formamidine Hydrobromide
(Low water content)
CAS RN: 146958-06-7

F1244 1g 5g 25g



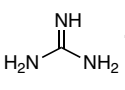
FABr
(99.99%, trace metals basis)
CAS RN: 146958-06-7

A3292 1g 5g



Acetamidine Hydrobromide
CAS RN: 1040352-82-6

G0449 1g 5g

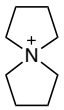


Guanidine Hydrobromide
CAS RN: 19244-98-5

I1006 1g 5g

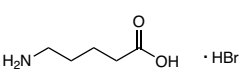
Imidazole Hydrobromide
(Low water content)
CAS RN: 101023-55-6

A3091 1g 5g



5-Azoniaspiro[4.4]nonane Bromide
CAS RN: 16450-38-7

A3094 1g 5g

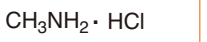


5-Aminovaleric Acid Hydrobromide
(Low water content)
CAS RN: 2173111-73-2

Chloride Salts

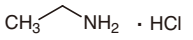
Please inquire for pricing and availability of listed products to our local sales representatives.

M0138 25g 500g



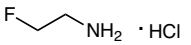
Methylamine Hydrochloride
CAS RN: 593-51-1

E0205 25g 500g



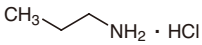
Ethylamine Hydrochloride
CAS RN: 557-66-4

F1250 1g 5g



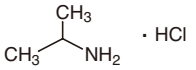
2-Fluoroethylamine Hydrochloride
CAS RN: 460-08-2

P0522 25g



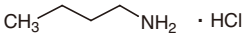
Propylamine Hydrochloride
CAS RN: 556-53-6

I0166 25g 100g 500g



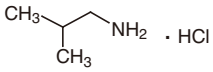
Isopropylamine Hydrochloride
CAS RN: 15572-56-2

B0710 25g 500g



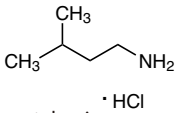
Butylamine Hydrochloride
CAS RN: 3858-78-4

I0096 25g 500g



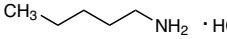
Isobutylamine Hydrochloride
CAS RN: 5041-09-8

I0083 1g 5g



Isopentylamine Hydrochloride
CAS RN: 541-23-1

P2736 1g 5g

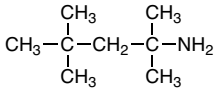


Pentylamine Hydrochloride
CAS RN: 142-65-4

O0484 1g 5g

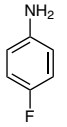
n-Octylamine Hydrochloride
CAS RN: 142-95-0

T3784 1g 5g



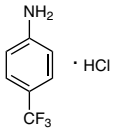
tert-Octylamine Hydrochloride
CAS RN: 58618-91-0

F1271 5g 25g



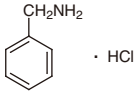
4-Fluoroaniline Hydrochloride
CAS RN: 2146-07-8

T3833 1g 5g



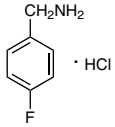
4-(Trifluoromethyl)aniline Hydrochloride
CAS RN: 90774-69-9

B0407 25g 100g 500g



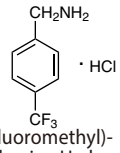
Benzylamine Hydrochloride
CAS RN: 3287-99-8

F1255 1g 5g



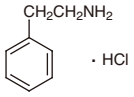
4-Fluorobenzylamine Hydrochloride
CAS RN: 659-41-6

T3836 1g 5g



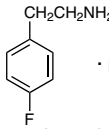
4-(Trifluoromethyl)-benzylamine Hydrochloride
CAS RN: 3047-99-2

P0086 25g 100g 500g



2-Phenylethylamine Hydrochloride
CAS RN: 156-28-5

F1256 1g 5g

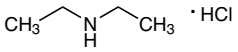


4-Fluorophenethylamine Hydrochloride
CAS RN: 459-19-8

M3284 5g 25g

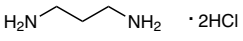
Morpholine Hydrochloride
CAS RN: 10024-89-2

D0468 25g 500g



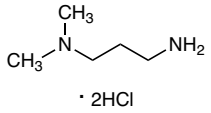
Diethylamine Hydrochloride
CAS RN: 660-68-4

D5253 1g 5g



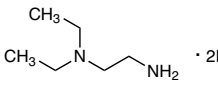
1,3-Diaminopropane Dihydrochloride
(Low water content)
CAS RN: 10517-44-9

D5617 1g 5g



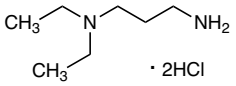
N,N-Dimethyl-1,3-propanediamine Dihydrochloride
CAS RN: 52198-63-7

D5860 5g



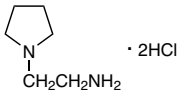
N,N-Diethylethylenediamine Dihydrochloride
CAS RN: 52198-62-6

D5861 5g



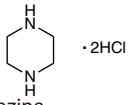
3-(Dimethylamino)-propylamine Dihydroiodide
CAS RN: 99310-71-1

A3393 5g



2-(1-Pyrrolidinyl)-ethanamine Dihydrochloride
CAS RN: 65592-36-1

P2491 1g 5g

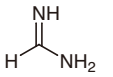


Piperazine Dihydrochloride
CAS RN: 142-64-3

D5251 1g 5g

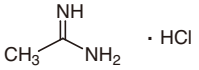
1,4-Diazabicyclo[2.2.2]-octane Dihydrochloride
CAS RN: 49563-87-3

F0103 5g 25g



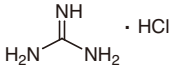
Formamidine Hydrochloride
CAS RN: 6313-33-3

A0008 25g 500g



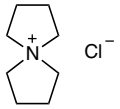
Acetamidine Hydrochloride
CAS RN: 124-42-5

G0162 25g 500g



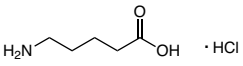
Guanidine Hydrochloride
CAS RN: 50-01-1

A3092 1g 5g



5-Azoniaspiro[4.4]nonane Chloride
CAS RN: 98997-63-8

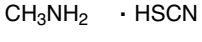
A0436 1g 5g



5-Aminovaleric Acid Hydrochloride
(Low water content)
CAS RN: 627-95-2

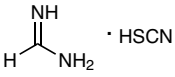
Pseudo Halide Salts

M2991 1g 5g



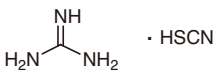
Methylamine Thiocyanate
CAS RN: 61540-63-4

F1153 1g 5g



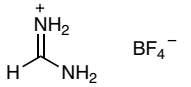
Formamidine Thiocyanate
CAS RN: 1821033-48-0

G0230 25g 500g



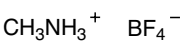
Guanidine Thiocyanate
CAS RN: 593-84-0

F1152 1g 5g



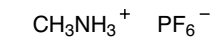
Formamidinium Tetrafluoroborate

M2990 1g 5g



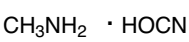
Methylammonium Tetrafluoroborate
CAS RN: 42539-74-2

M2989 1g 5g



Methylamine Hexafluorophosphate
CAS RN: 28302-50-3

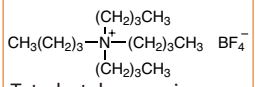
M3134 1g 5g



Methylamine Cyanate
CAS RN: 63405-91-4

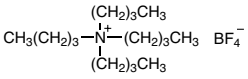
Carrier Transport Materials

T0914 25g 100g 500g



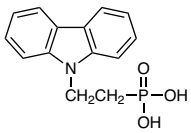
Tetrabutylammonium Tetrafluoroborate
CAS RN: 429-42-5

T2648 25g



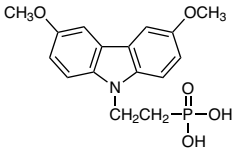
Tetrabutylammonium Tetrafluoroborate
(Br <0.02 %)
CAS RN: 429-42-5

C3663 500mg



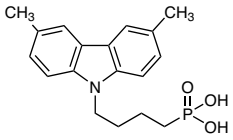
2PACz
CAS RN: 20999-38-6

D5798 500mg



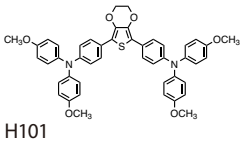
MeO-2PACz
CAS RN: 2377770-18-6

M3359 500mg



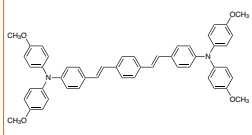
Me-4PACz

D5155 200mg



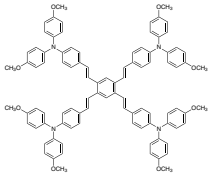
H101
CAS RN: 1622008-73-4

B5672 1g 5g 25g



TOP-HTM-α1
CAS RN: 872466-50-7

T3722 1g 5g 25g

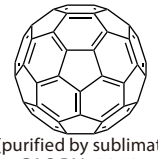


TOP-HTM-α2

B1641 100mg 500mg 1g

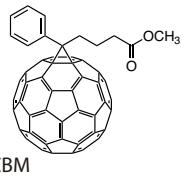
C_{60} (pure)
CAS RN: 99685-96-8

F1232 100mg



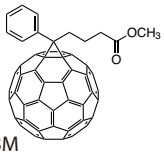
C_{60} (purified by sublimation)
CAS RN: 99685-96-8

M2088 100mg



PCBM
CAS RN: 160848-22-6

P2682 100mg

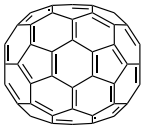


PCBM
[for organic electronics]
CAS RN: 160848-22-6

B1694 100mg

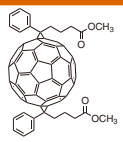
Fullerene C_{70}
CAS RN: 115383-22-7

F1233 100mg



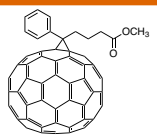
Fullerene C_{70}
[for organic electronics]
CAS RN: 115383-22-7

B4576 50mg



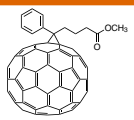
Bis-PCBM
(mixture of isomers)
CAS RN: 1048679-01-1

M2550 50mg



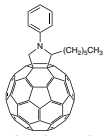
[70]PCBM
(mixture of isomers)
CAS RN: 609771-63-3

P2683 100mg



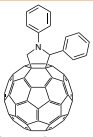
[70]PCBM
(mixture of isomers)
[for organic electronics]
CAS RN: 609771-63-3

P2744 100mg



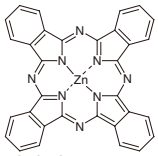
N-Phenyl-2-hexyl-[60]fulleropyrrolidine
CAS RN: 1426332-00-4

D5757 100mg



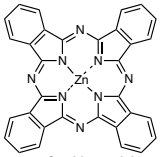
N,2-Diphenyl-[60]fulleropyrrolidine
CAS RN: 1373934-14-5

P0767 1g 5g 25g



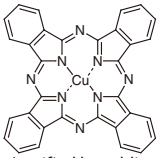
Zinc Phthalocyanine
CAS RN: 14320-04-8

Z0037 500mg



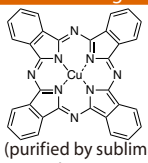
ZnPc (purified by sublimation)
CAS RN: 14320-04-8

P1628 1g



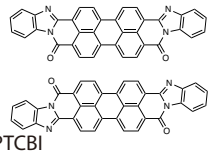
CuPc (purified by sublimation)
CAS RN: 147-14-8

C3645 100mg 500mg



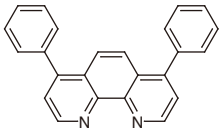
CuPc (purified by sublimation)
[for organic electronics]
CAS RN: 147-14-8

P2119 200mg



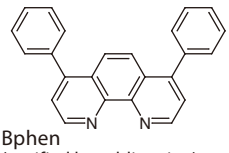
PTCBI
(*cis*- and *trans*- mixture)
CAS RN: 79534-91-1

D0905 1g 5g



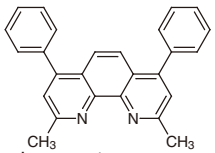
Bphen
CAS RN: 1662-01-7

B2695 1g



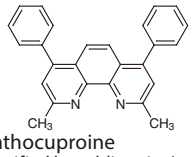
Bphen
(purified by sublimation)
CAS RN: 1662-01-7

D0711 1g 5g



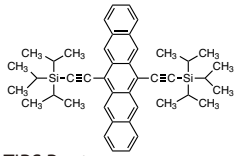
Bathocuproine
CAS RN: 4733-39-5

B2694 1g 5g



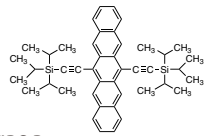
Bathocuproine
(purified by sublimation)
CAS RN: 4733-39-5

B3562 100mg



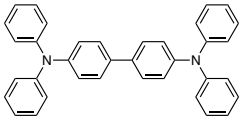
TIPS Pentacene
CAS RN: 373596-08-8

B5942 100mg



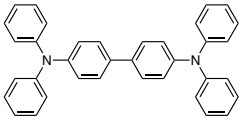
TIPS Pentacene
[for organic electronics]
CAS RN: 373596-08-8

T1812 5g 25g



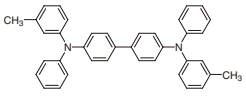
TPB
CAS RN: 15546-43-7

T3266 1g 5g



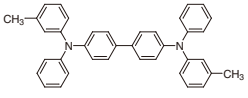
TPB (purified by sublimation)
CAS RN: 15546-43-7

D2448 1g 5g



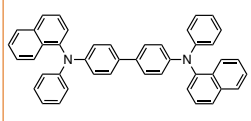
TPD
CAS RN: 65181-78-4

D3236 1g 5g



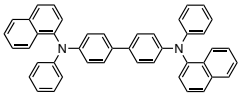
TPD (purified by sublimation)
CAS RN: 65181-78-4

D5126 1g 5g



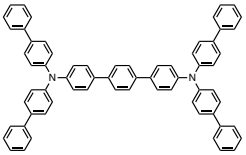
α-NPB
CAS RN: 123847-85-8

D3970 1g 5g



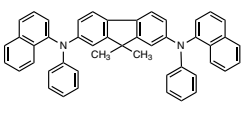
α-NPB
(purified by sublimation)
CAS RN: 123847-85-8

T3656 1g



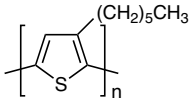
TaTm
CAS RN: 952431-34-4

B4926 200mg 1g



DMFL-NPB
CAS RN: 222319-05-3

P2513 100mg 500mg



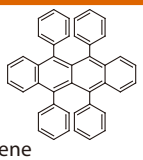
P3HT (regioregular)
CAS RN: 110134-47-9

Please inquire for pricing and availability of listed products to our local sales representatives.

T0561 100mg 1g

Rubrene
CAS RN: 517-51-1

T2233 250mg 1g



Rubrene
(purified by sublimation)
CAS RN: 517-51-1

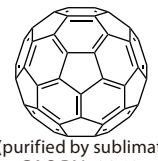
Organic Solar Cell (OPV) Materials

Acceptor Materials

B1641 100mg 500mg 1g

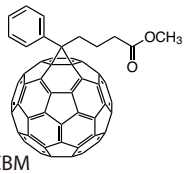
C_{60} (pure)
CAS RN: 99685-96-8

F1232 100mg



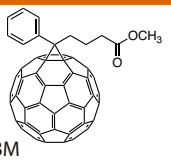
C_{60} (purified by sublimation)
CAS RN: 99685-96-8

M2088 100mg



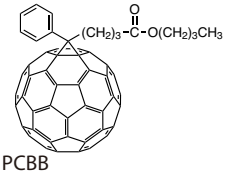
PCBM
CAS RN: 160848-22-6

P2682 100mg



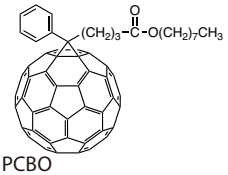
PCBM
[for organic electronics]
CAS RN: 160848-22-6

P2013 100mg



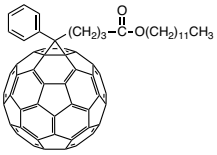
PCBB
CAS RN: 571177-66-7

P2014 100mg



PCBO
CAS RN: 571177-68-9

P2015 100mg

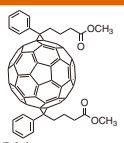


[60]PCB-C_{12}
CAS RN: 571177-69-0

I0900 50mg

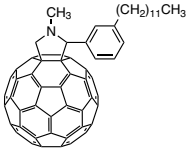
ICBA
CAS RN: 1207461-57-1

B4576 50mg



Bis-PCBM
(mixture of isomers)
CAS RN: 1048679-01-1

C2415 100mg

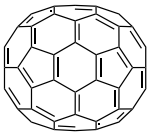


$C_{60}MC_{12}$
CAS RN: 403483-19-2

B1694 100mg

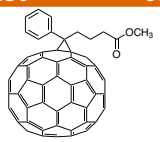
Fullerene C_{70}
CAS RN: 115383-22-7

F1233 100mg



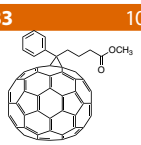
Fullerene C_{70}
[for organic electronics]
CAS RN: 115383-22-7

M2550 50mg



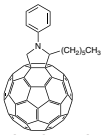
[70]PCBM
(mixture of isomers)
CAS RN: 609771-63-3

P2683 100mg



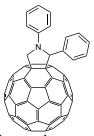
[70]PCBM
(mixture of isomers)
[for organic electronics]
CAS RN: 609771-63-3

P2744 100mg



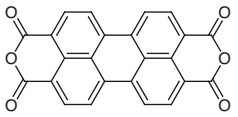
N-Phenyl-2-hexyl-[60]fulleropyrrolidine
CAS RN: 1426332-00-4

D5757 100mg



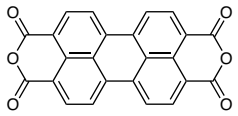
N,2-Diphenyl-[60]fulleropyrrolidine
CAS RN: 1373934-14-5

P0972 25g 100g 500g



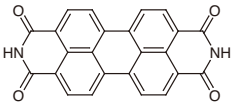
Pigment Red 224
CAS RN: 128-69-8

P2102 1g



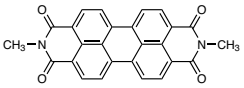
Pigment Red 224
(purified by sublimation)
CAS RN: 128-69-8

P0984 25g



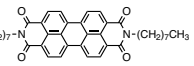
3,4,9,10-Perylene-tetracarboxylic Diimide
CAS RN: 81-33-4

D4429 1g 5g



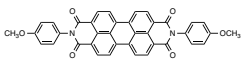
Pigment Red 179
CAS RN: 5521-31-3

D4175 1g



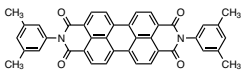
PTCDI-C_8
CAS RN: 78151-58-3

B2892 1g 5g



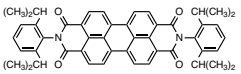
Pigment Red 190
CAS RN: 6424-77-7

B4231 1g 5g



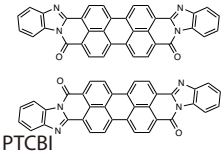
Pigment Red 149
CAS RN: 4948-15-6

B4268 1g 5g



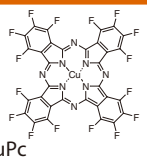
Perylene Orange
CAS RN: 82953-57-9

P2119 200mg



PTCBI
(*cis*- and *trans*- mixture)
CAS RN: 79534-91-1

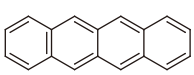
H1194 100mg 1g



$F_{16}CuPc$
(purified by sublimation)
CAS RN: 14916-87-1

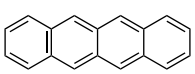
Donor Materials

N0001 100mg 1g 5g



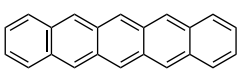
Naphthacene
CAS RN: 92-24-0

N0951 200mg 1g



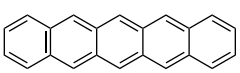
Naphthacene
(purified by sublimation)
CAS RN: 92-24-0

P0030 100mg 1g



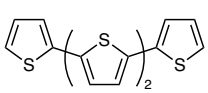
Pentacene
(purified by sublimation)
CAS RN: 135-48-8

P2524 100mg 1g



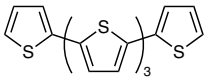
Pentacene
(99.999%, trace metals basis)
(purified by sublimation)
CAS RN: 135-48-8

Q0078 100mg



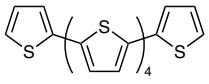
α-Quaterthiophene
CAS RN: 5632-29-1

Q0079 100mg 500mg



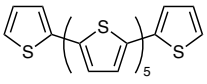
α-Quinquethiophene
CAS RN: 5660-45-7

S0504 100mg 1g



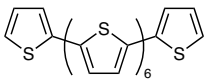
6T (purified by sublimation)
CAS RN: 88493-55-4

S0505 100mg



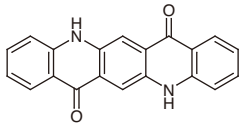
α-Septithiophene
CAS RN: 86100-63-2

O0313 100mg



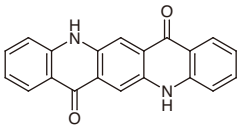
α-Octithiophene
CAS RN: 113728-71-5

Q0057 5g 25g



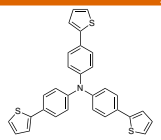
Quinacridone
CAS RN: 1047-16-1

Q0083 1g



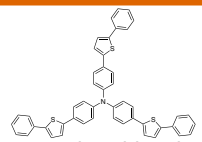
Quinacridone
(purified by sublimation)
CAS RN: 1047-16-1

T3050 1g 5g



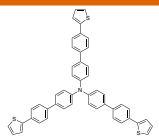
Tris[4-(2-thienyl)phenyl]-amine
CAS RN: 142807-63-4

T3328 200mg



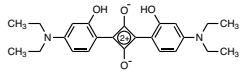
Tris[4-(5-phenylthiophen-2-yl)phenyl]amine
CAS RN: 803727-09-5

T3337 200mg



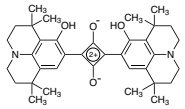
Tris[4'-(2-thienyl)-4-biphenylyl]amine
CAS RN: 1092356-36-9

B4342 1g 5g



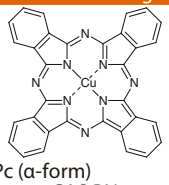
2,4-Bis[4-(diethylamino)-2-hydroxyphenyl]-squaraine
CAS RN: 68842-66-0

B4649 1g 5g



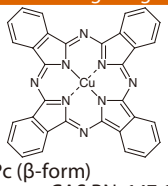
2,4-Bis[8-hydroxy-1,1,7,7-tetramethyljulolidin-9-yl]-squaraine
CAS RN: 358727-55-6

P1005 25g 250g



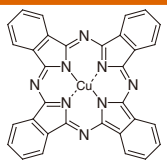
CuPc (α-form)
CAS RN: 147-14-8

P1006 25g 100g 500g



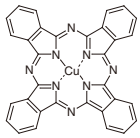
CuPc (β-form)
CAS RN: 147-14-8

P0655 25g



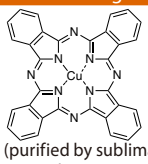
CuPc
CAS RN: 147-14-8

P1628 1g



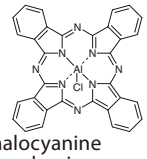
CuPc
(purified by sublimation)
CAS RN: 147-14-8

C3645 100mg 500mg



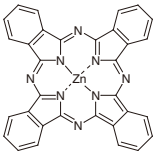
CuPc (purified by sublimation)
[for organic electronics]
CAS RN: 147-14-8

C1167 1g 5g



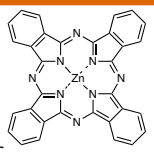
Phthalocyanine Chloroaluminum
CAS RN: 14154-42-8

P0767 1g 5g 25g



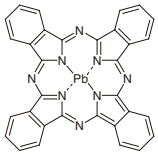
ZnPc
CAS RN: 14320-04-8

Z0037 500mg



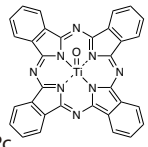
ZnPc
(purified by sublimation)
CAS RN: 14320-04-8

P0766 1g 25g



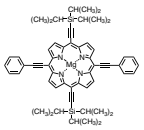
Lead(II) Phthalocyanine
CAS RN: 15187-16-3

T2272 200mg 1g



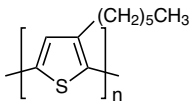
TiOPc
(purified by sublimation)
CAS RN: 26201-32-1

B4314 50mg



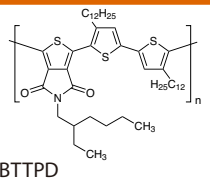
[5,15-Bis(phenylethynyl)-10,20-bis[(triisopropylsilyl)ethynyl]-porphyrinato]magnesium(II)
CAS RN: 1397288-30-0

P2513 100mg 500mg



P3HT (regioregular)
CAS RN: 110134-47-9

P2710 100mg

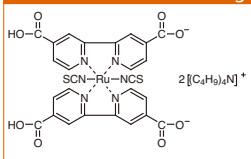


PBTTPD
CAS RN: 1240372-42-2

Dye-Sensitized Solar Cell (DSSC) Materials

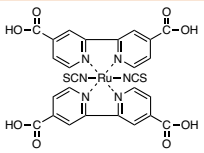
Dye Sensitizers

B3514 100mg



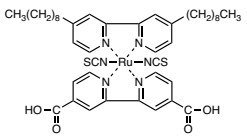
N719 Dye
CAS RN: 207347-46-4

B4372 200mg



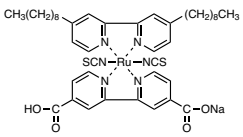
N3 Dye
CAS RN: 141460-19-7

B4373 200mg



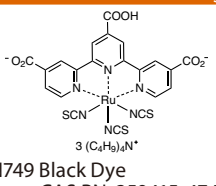
Z907 Dye
CAS RN: 502693-09-6

B4432 200mg



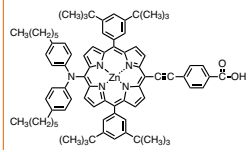
Z907 Dye Sodium Salt
CAS RN: 871466-65-8

N1104 100mg



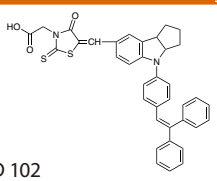
N749 Black Dye
CAS RN: 359415-47-7

Y0011 50mg



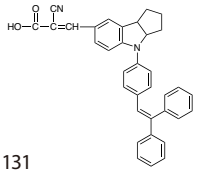
YD2
CAS RN: 1201915-91-4

D4430 50mg



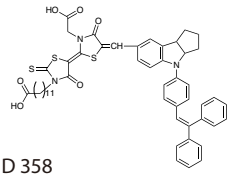
D 102
CAS RN: 652145-28-3

D4431 50mg



D 131
CAS RN: 652145-29-4

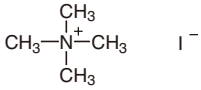
D4432 50mg



D 358
CAS RN: 1207638-53-6

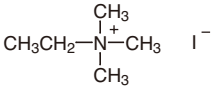
Electrolytes

T0139 25g 100g 500g



Tetramethylammonium Iodide
CAS RN: 75-58-1

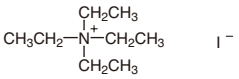
E0190 25g



Ethyltrimethylammonium Iodide
CAS RN: 51-93-4

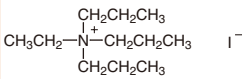
Please inquire for pricing and availability of listed products to our local sales representatives.

T0097 25g 100g 500g



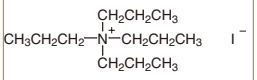
Tetraethylammonium Iodide
CAS RN: 68-05-3

E0191 25g



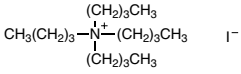
Ethyltripropylammonium Iodide
CAS RN: 15066-80-5

T0172 25g 100g



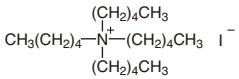
Tetrapropylammonium Iodide
CAS RN: 631-40-3

T0057 25g 100g 500g



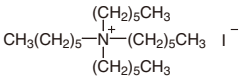
Tetrabutylammonium Iodide
CAS RN: 311-28-4

T1011 5g 25g



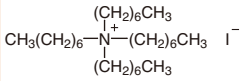
Tetraamylammonium Iodide
CAS RN: 2498-20-6

T1010 5g 25g



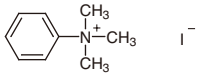
Tetrahexylammonium Iodide
CAS RN: 2138-24-1

T1396 25g



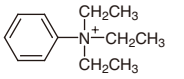
Tetraheptylammonium Iodide
CAS RN: 3535-83-9

P0246 25g



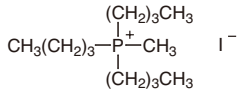
Trimethylphenyl-ammonium Iodide
CAS RN: 98-04-4

P0242 5g 25g



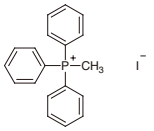
Triethylphenylammonium Iodide
CAS RN: 1010-19-1

M1455 5g 25g



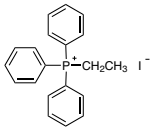
Tributylmethyl-phosphonium Iodide
CAS RN: 1702-42-7

M0253 25g 100g 500g



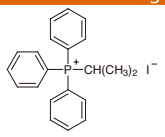
Methyltriphenyl-phosphonium Iodide
CAS RN: 2065-66-9

E0549 25g 250g



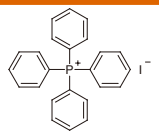
Ethyltriphenyl-phosphonium Iodide
CAS RN: 4736-60-1

I0552 5g 25g



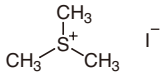
Isopropyltriphenyl-phosphonium Iodide
CAS RN: 24470-78-8

T1450 10g



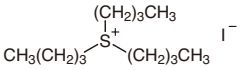
Tetraphenylphosphonium Iodide
CAS RN: 2065-67-0

T1056 25g 500g



Trimethylsulfonium Iodide
CAS RN: 2181-42-2

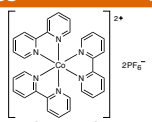
T1564 1g



Tributylsulfonium Iodide
CAS RN: 18146-62-8

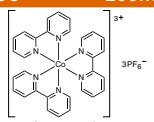
Hole Conductor Cobalt Dopants

T3255 1g 5g



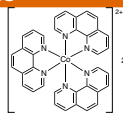
Tris(2,2'-bipyridine)-cobalt(II) Bis(hexafluorophosphate)
CAS RN: 79151-78-3

T3256 200mg 1g



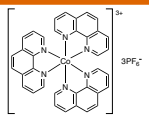
Tris(2,2'-bipyridine)-cobalt(III) Tris(hexafluorophosphate)
CAS RN: 28277-53-4

T3553 1g 5g



Tris(1,10-phenanthroline)-cobalt(II) Bis(hexafluorophosphate)
CAS RN: 31876-74-1

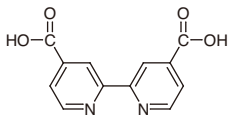
T3554 1g 5g



Tris(1,10-phenanthroline)-cobalt(III) Tris(hexafluorophosphate)
CAS RN: 28277-59-0

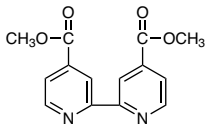
Ligands

B1876 100mg 1g



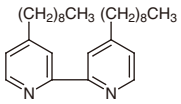
2,2'-Biisonicotinic Acid
CAS RN: 6813-38-3

D4635 1g 5g



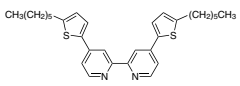
Dimethyl 2,2'-Bipyridine-4,4'-dicarboxylate
CAS RN: 71071-46-0

D3917 1g 5g



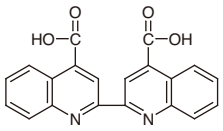
4,4'-Dinonyl-2,2'-bipyridyl
CAS RN: 142646-58-0

B4420 200mg



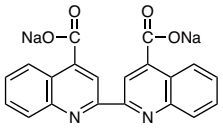
4,4'-Bis(5-hexyl-2-thienyl)-2,2'-bipyridyl
CAS RN: 1047684-56-9

B3509 1g 5g



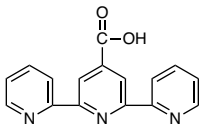
2,2'-Bicinchoninic Acid
CAS RN: 1245-13-2

B4509 1g 5g



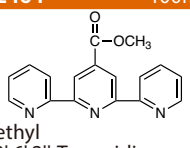
Bicinchoninic Acid Disodium Salt
CAS RN: 979-88-4

T3245 200mg 1g



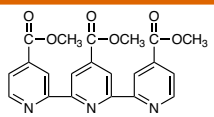
2,2':6',2''-Terpyridine-4'-carboxylic Acid
CAS RN: 148332-36-9

M2464 100mg



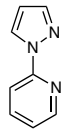
Methyl 2,2':6',2''-Terpyridine-4'-carboxylate
CAS RN: 247058-06-6

T2959 200mg



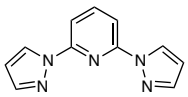
Trimethyl 2,2':6',2''-Terpyridine-4,4',4''-tricarboxylate
CAS RN: 330680-46-1

P2239 1g 5g



2-(1-Pyrazolyl)pyridine
CAS RN: 25700-11-2

D4672 1g 5g



2,6-Di(1-pyrazolyl)-pyridine
CAS RN: 123640-38-0

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