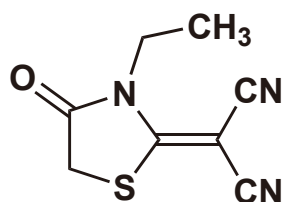


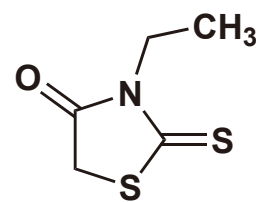
# Electron-Accepting Building Blocks for Charge Transport Materials



**2-(3-Ethyl-4-oxothiazolidin-2-ylidene)malononitrile**

1g / 5g / 25g

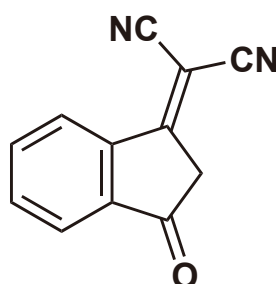
[E1549] **New**



**3-Ethylrhodanine**

5g / 25g

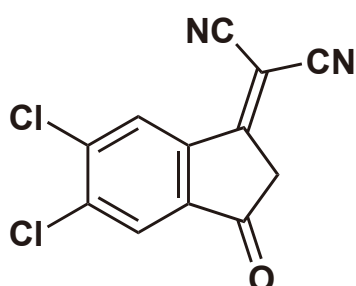
[E0174]



**3-(Dicyanomethylidene)-indan-1-one**

1g / 5g

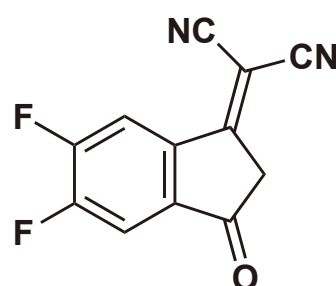
[D2054]



**(5,6-Dichloro-3-oxo-2,3-dihydro-1H-inden-1-ylidene)malononitrile**

1g

[D5945]



**(5,6-Difluoro-3-oxo-2,3-dihydro-1H-inden-1-ylidene)malononitrile**

1g

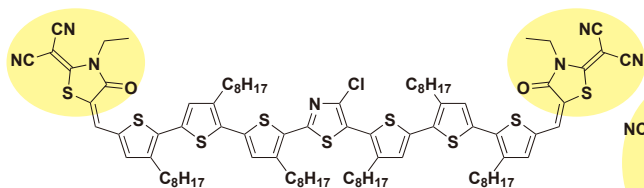
[D5815]

These electron-accepting building blocks have been used for both p-type and n-type materials in organic photovoltaics as well as hole transport materials in perovskite solar cells. The energy levels of the materials can be adjusted by selecting different building blocks.

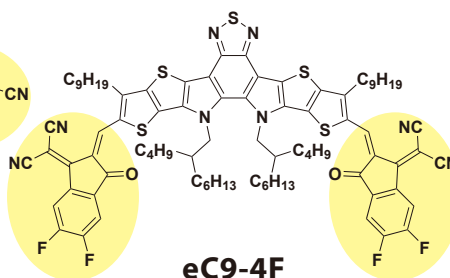
# Electron-Accepting Building Blocks for Charge Transport Materials

## Applications

### Organic Photovoltaic Materials

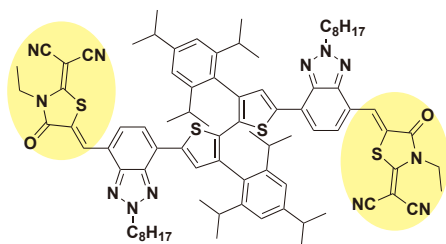


**Tz6T**

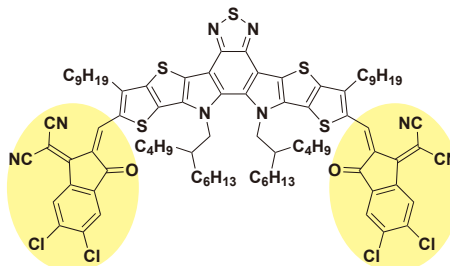


**eC9-4F**

Organic photovoltaics<sup>1)</sup> using Tz6T as a p-type material, eC9-4F as a n-type material. PCE: 16.0%



**GS-ISO**

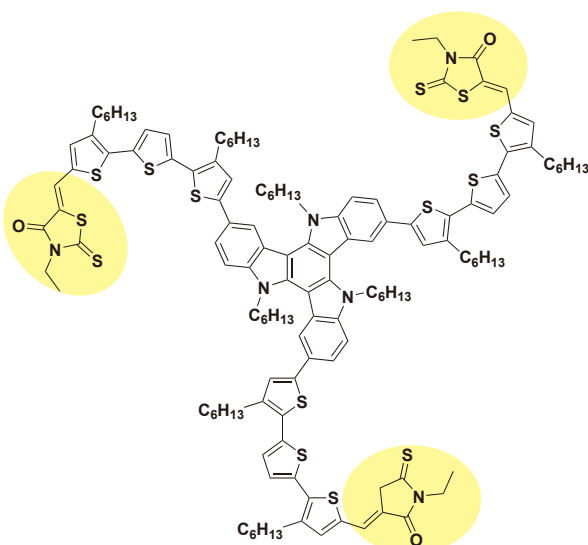


**BTP-eC9**

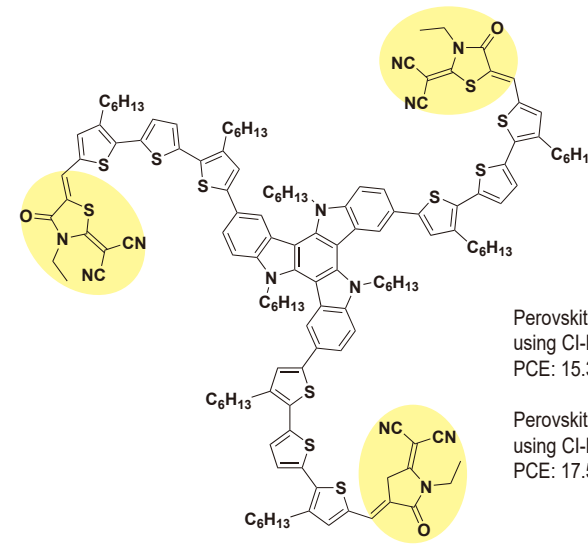
Tandem solar cell<sup>2)</sup> using PBDB-TF as a p-type material, BTP-eC9 as a n-type material (Top), PBDB-TF as a p-type material, eC9-4F as a n-type material (Bottom). PCE: 20.2%

### Perovskite Solar Cell Materials

#### (Dopant-Free Hole Transport Materials for Perovskite Solar Cells)<sup>3)</sup>



**CI-B2**



**CI-B3**

Perovskite solar cells using CI-B2. PCE: 15.33%

Perovskite solar cells using CI-B3. PCE: 17.54%

#### References

- 1) D. Hu, S. Lu, *et al.*, *Adv. Funct. Mater.* **2022**, 2211873. <https://doi.org/10.1002/adfm.202211873>
- 2) Z. Zheng, J. Hou, *et al.*, *Joule* **2022**, 6, 171. <https://doi.org/10.1016/j.joule.2021.12.017>
- 3) C. Igci, M. K. Nazeeruddin, *et al.*, *Sol. RRL* **2020**, 2000173. <https://doi.org/10.1002/solr.202000173>

#### Ordering and Customer Service

##### TCI AMERICA

Tel : 800-423-8616 / 503-283-1681  
Fax : 888-520-1075 / 503-283-1987  
E-mail : Sales-US@TCIchemicals.com

##### TCI EUROPE N.V.

Tel : +32 (0)3 735 07 00  
Fax : +32 (0)3 735 07 01  
E-mail : Sales-EU@TCIchemicals.com

##### TCI Deutschland GmbH

Tel : +49 (0)6196 64053-00  
Fax : +49 (0)6196 64053-01  
E-mail : Sales-DE@TCIchemicals.com

##### Tokyo Chemical Industry UK Ltd.

Tel : +44 (0)1865 78 45 60  
E-mail : Sales-UK@TCIchemicals.com

##### 梯希爱(上海)化成工业发展有限公司

Tel : 800-988-0390 / 021-67121386  
Fax : 021-6712-1385  
E-mail : Sales-CN@TCIchemicals.com

##### Tokyo Chemical Industry (India) Pvt. Ltd.

Tel : 1800 425 7889 / 044-2262 0909  
E-mail : Sales-IN@TCIchemicals.com

##### TOKYO CHEMICAL INDUSTRY CO., LTD.

Tel : +81 (0)3-5640-8878  
E-mail : globalbusiness@TCIchemicals.com

Availability, price or specification of the listed products are subject to change without prior notice. Reproduction forbidden without the prior written consent of Tokyo Chemical Industry Co., Ltd.