

# Organic Semiconductors (OSC) p-Type Organic Semiconductors

Organic field-effect transistors (OFETs) have been good attentions as mechanically flexible and lightweight materials. Printed flexible devices for active layer made from organic semiconductor materials can be manufactured by means of low-cost and environment-friendly coating processes, and are particularly expected as next-generation electronics.

A newly line-up of highly soluble p-type semiconductor materials with high hole mobility is available from FUJIFILM Wako. These products are new materials developed by the joint research with Prof. Dr. Takeya and Assoc. Prof. Dr. Okamoto of The University of Tokyo and FUJIFILM Corporation.

## Features

◆ **High hole mobility**

The hall mobility is over 5 cm<sup>2</sup>/Vs.

◆ **High heat resistance**

The products do not deteriorate even when used at the temperature required for OSC patterning.

◆ **High solubility**

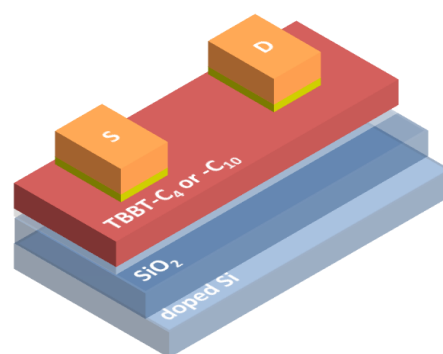
Solubility in toluene : 0.5 wt%

◆ **High repeatability**

Good repeatability was confirmed in the characterization of the transistor by Pi-Crystal, Inc.

◆ **Sublimated products**

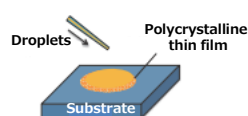
The purity of over 99% is guaranteed



## Summary of various transistor element characteristics

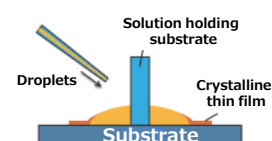
Film production method	Substrate temperature (°C)	$\mu_{\max}$ (cm <sup>2</sup> /Vs) <sup>a</sup>	$V_{th}$ (V) <sup>b</sup>	$I_{on}/I_{off}$
Drop-casting	40	4.0	-21 – -37	10 <sup>6</sup>
Edge-casting	40	6.2	-15 – -20	10 <sup>6</sup>
Vacuum deposition	60	1.8	-15 – -20	10 <sup>6</sup>
	100	1.0	-15 – -20	10 <sup>6</sup>

### Drop-casting



The solvent evaporates from around the droplet

### Edge-casting

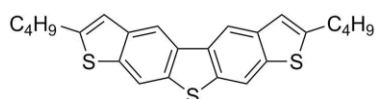


The solvent evaporates towards the solution holding substrate

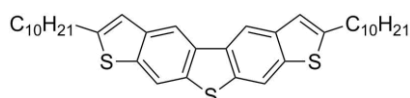
a) Evaluated in the saturation region. b) The gate insulator is SiO<sub>2</sub> with a thickness of 200 nm.

## Product list

TBBT-C<sub>4</sub>



TBBT-C<sub>10</sub>



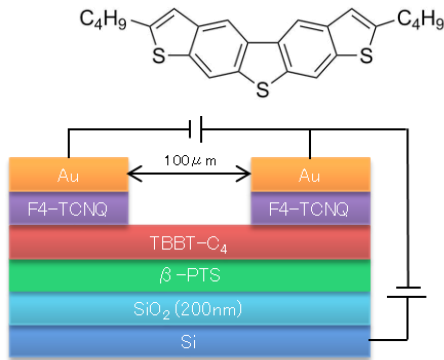
Product Number	Product Name	Package Size	Price
208-20821	TBBT-C <sub>4</sub>	100mg	List Price 750.00 USD
205-20831	TBBT-C <sub>10</sub>	100mg	List Price 750.00 USD

● References

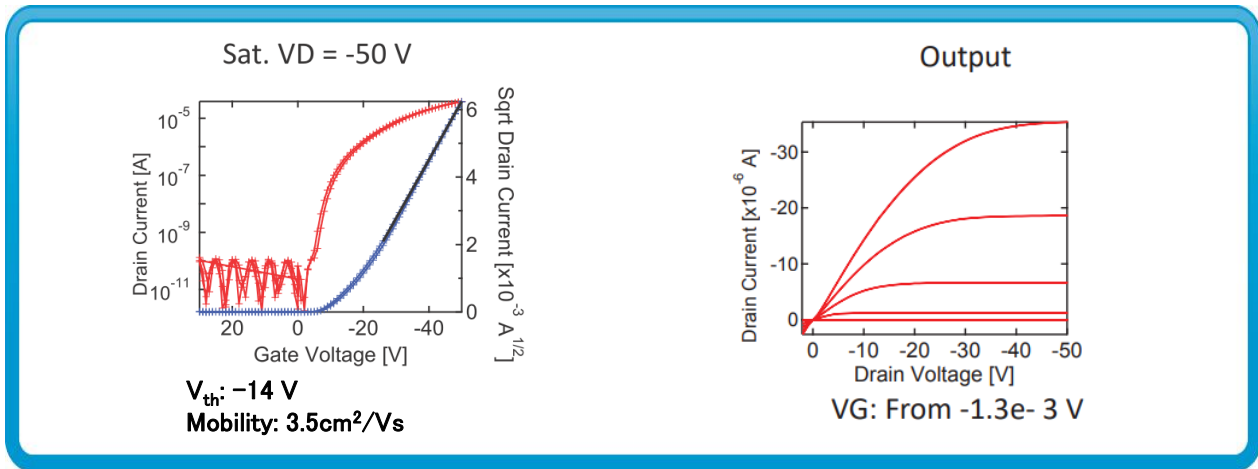
- Okamoto, T. and Takeya, J. *et al.*: *Adv. Mater.*, **25**, 6392 (2013).
- Okamoto, T. *et al.*: *J. Mater. Chem. C*, **5**, 1903 (2017).

# Crystal film fabrication by edge casting method and transistor characterization evaluation

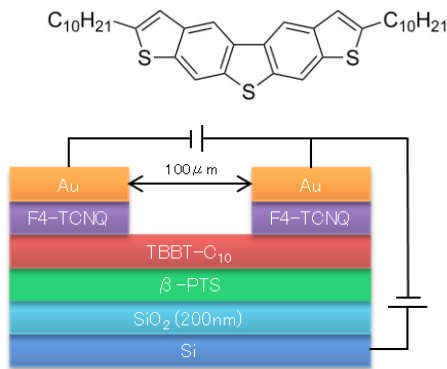
## TBBT-C<sub>4</sub>



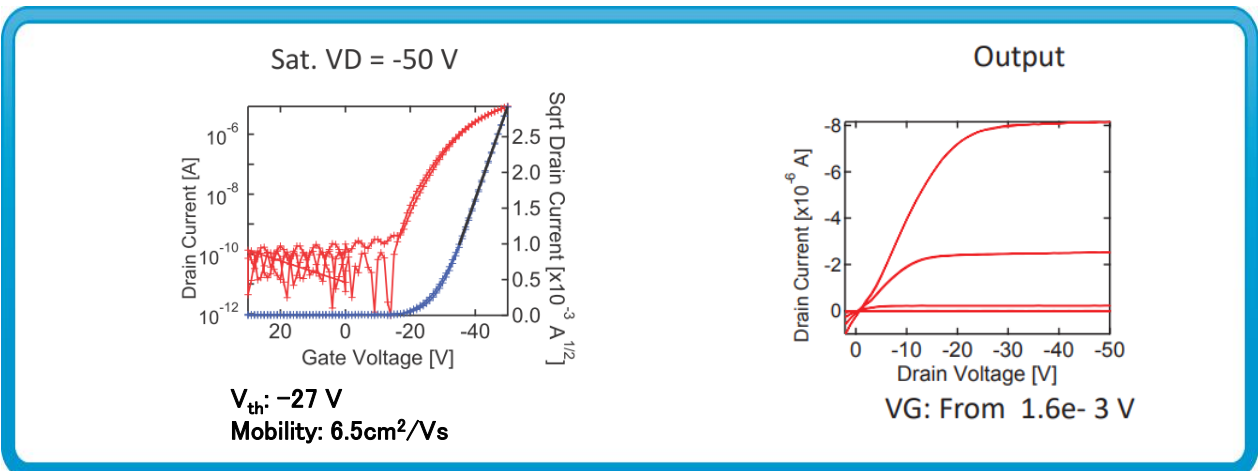
Coating film formation conditions	
Solvent	Toluene
Concentration	0.05 wt%
Melted temperature	60°C
Hot plate temperature	50°C
Substrate	SiO <sub>2</sub> 200nm
SAM	β-PTS
Drop amount	1 drop
Drying	Under pressure, 50 °C, 8 h



## TBBT-C<sub>10</sub>

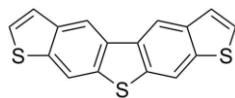


Coating film formation conditions	
Solvent	Anisole
Concentration	0.05 wt%
Melted temperature	70°C
Hot plate temperature	40°C
Substrate	SiO <sub>2</sub> 200nm
SAM	β-PTS
Drop amount	1 drop
Drying	Under pressure, 70 °C, 24 h

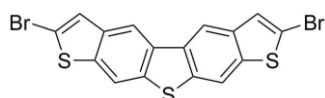


## Organic semiconductor building block product list

### TBBT-H<sub>2</sub>



### TBBT-Br<sub>2</sub>



Product Number	Product Name	Package Size	Price
204-20801	TBBT-H <sub>2</sub>	250mg	List Price 400.00 USD
201-20811	TBBT-Br <sub>2</sub>	250mg	List Price 450.00 USD

Listed products are intended for laboratory research use only, and not to be used for drug, food or human use. / Please visit our online catalog to search for other products from Wako; <https://labchem-wako.fujifilm.com> / This leaflet may contain products that cannot be exported to your country due to regulations. / Bulk quote requests for some products are welcomed. Please contact us.

### FUJIFILM Wako Pure Chemical Corporation

<https://labchem-wako.fujifilm.com>  
1-2, Doshomachi 3-Chome Chuo-Ku, Osaka 540-8605, Japan  
Tel.: +81 6 6203 3741 Fax: +81 6 6203 1999  
[ffwk-cservice@fujifilm.com](mailto:ffwk-cservice@fujifilm.com)



### FUJIFILM Wako Chemicals U.S.A. Corporation

[www.wakousa.com](http://www.wakousa.com)  
1600 Bellwood Road Richmond, VA 23237, USA  
Toll-Free (U.S. only): +1 877 714 1920  
Tel.: +1 804 714 1920 Fax: +1 804 271 7791  
[wkuslabchem@fujifilm.com](mailto:wkuslabchem@fujifilm.com)

### FUJIFILM Wako Chemicals Europe GmbH

[www.wako-chemicals.de](http://www.wako-chemicals.de)  
Fuggerstr 12, 41468 Neuss, Germany  
Tel.: +49 2131 311 0 Fax: +49 2131 311 100  
[labchem\\_wkeu@fujifilm.com](mailto:labchem_wkeu@fujifilm.com)