

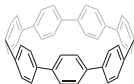
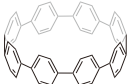
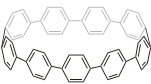
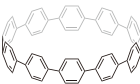
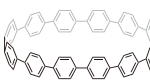





















# Carbon Nanoring Material Cycloparaphenylene (CPP)

## Advantages

- Rich variety of cycloparaphenylenes (CPP)  
(From the possible smallest [5]CPP up to [12]CPP)
- Diverse light absorption and emission depending on the ring size
- Unit structure of carbon nanotube (CNT)
- Ring-shaped carbon materials with unique and unexplored properties

							
	[5]CPP [C2931]	[6]CPP [C3386]	[7]CPP [C3571]	[8]CPP [C3544]	[9]CPP [C3465]	[10]CPP [C3493]	[12]CPP [C2449]
Solid							
Solution							
Fluorescence							

※[5]CPP is the smallest synthesizable cycloparaphenylene.

[5]Cycloparaphenylene ([5]CPP)	20mg / 100mg [C2931]
[6]Cycloparaphenylene ([6]CPP)	20mg [C3386]
[7]Cycloparaphenylene ([7]CPP)	10mg [C3571]
[8]Cycloparaphenylene ([8]CPP)	20mg [C3544]
[9]Cycloparaphenylene ([9]CPP) (This product is unavailable in the U.S.)	20mg [C3465]
[10]Cycloparaphenylene ([10]CPP)	20mg [C3493]
[12]Cycloparaphenylene ([12]CPP)	10mg [C2449]

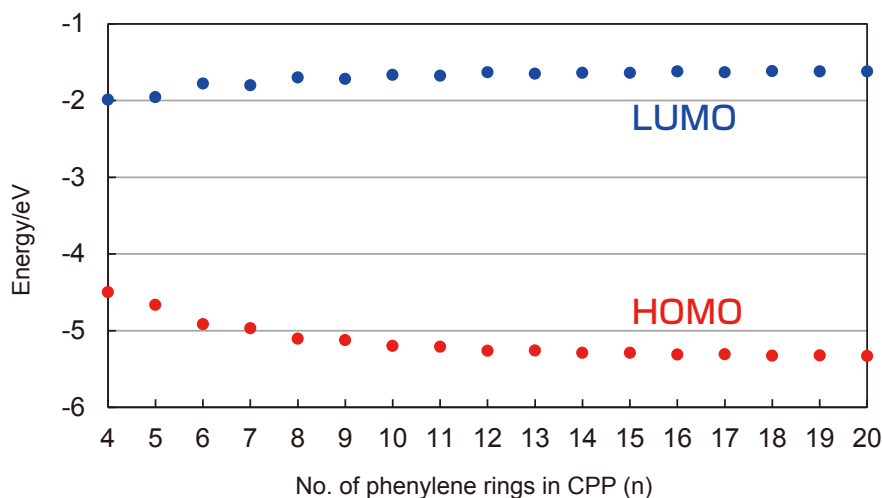
## Related product

(6,6)Carbon Nanobelt Bis(tetrahydrofuran) Adduct ([12]CNB-2THF) 10mg [I1078]

# Carbon Nanoring Material Cycloparaphenylene (CPP)

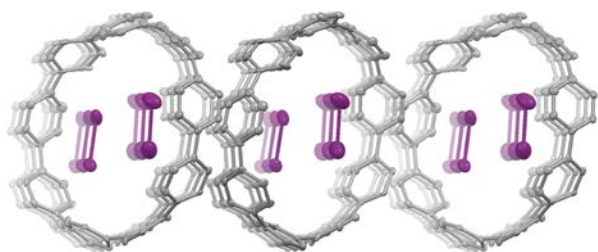
## Properties and applications of CPP

### Relation between no. of phenylene (n) and HOMO, LUMO in [n]CPP<sup>1)</sup>



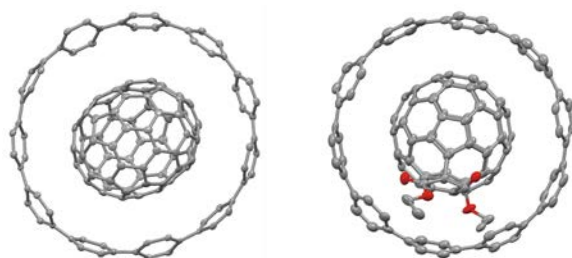
HOMO-LUMO gap decreases with decreasing ring size.

### CPP-iodine complex<sup>2)</sup>



Electrically activated conductivity and white light emission

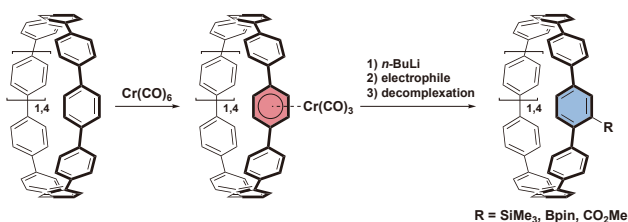
### Encapsulation of fullerene by CPP<sup>3)</sup>



[11]CPP⊃C<sub>70</sub>

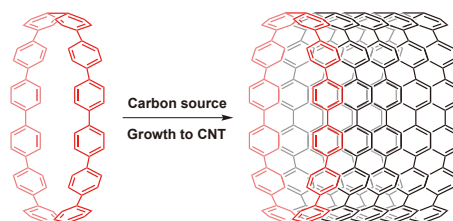
[10]CPP⊃C<sub>70</sub>C(CO<sub>2</sub>Et)<sub>2</sub>

### Functionalization of CPP<sup>4)</sup>



One phenylene ring can be readily functionalized.

### CPP growth to CNT<sup>5)</sup>



Bottom up synthesis of CNT with uniform diameter

- References**
- (1) T. Iwamoto, Y. Watanabe, Y. Sakamoto, T. Suzuki, S. Yamago, *J. Am. Chem. Soc.* **2011**, *133*, 8354.
  - (2) N. Ozaki, H. Sakamoto, T. Nishihara, T. Fujimori, Y. Hijikata, R. Kimura, S. Irle, K. Itami, *Angew. Chem. Int. Ed.* **2017**, *56*, 11196.
  - (3) T. Iwamoto, Y. Watanabe, H. Takaya, T. Haino, N. Yasuda, S. Yamago, *Chem. Eur. J.* **2013**, *19*, 14061.
  - (4) N. Kubota, Y. Segawa, K. Itami, *J. Am. Chem. Soc.* **2015**, *137*, 1356.
  - (5) H. Omachi, T. Nakayama, E. Takahashi, Y. Segawa, K. Itami, *Nat. Chem.* **2013**, *5*, 572.

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cycloparaphenylene

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

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

Tel : +81 (0)3-5640-8878  
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