

# CARBON NANOTUBE

We tune the physical dimensions, diameter and length, of multi-walled carbon nanotube for you. Our CNTs are millimeter-scale in length and highly aligned. You can build up large-scale CNT structures with our millimeter-long aligned drawable CNTs.

## CNT, made in Hamamatsu Carbonics, is ...

### LONG

longer than 1mm  
helping your easy handling

### STRAIGHT

just straight as described in books

### HIGH DENSITY

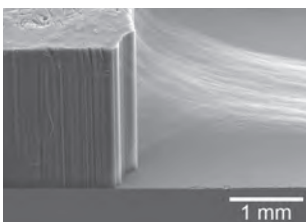
vertically aligned on a substrate  
with high areal density

CNT is a nano-sized fiber material made of carbon atoms, and has very high electrical conductivity, high thermal conductivity, and high mechanical properties. To utilize those features, HCC's provides long, easy handling, aligned CNTs.

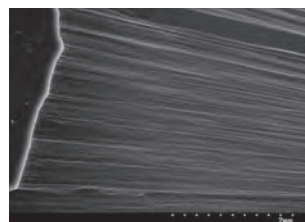
## Do you know CNT forest is drawable?

### Super drawability

- 1.CNTs are connected by van der Waals forces, and can form a web-like structure
- 2.CNTs are self-aligned in the drawing direction in the web
- 3.No binder material is required
- 4.CNT web is used as a precursor for spun yarns, sheets and more



CNT web is drawn from an edge of a CNT forest. CNTs are connected at surfaces by van der Waals force strongly. The web is very light weight and robust, and sometimes semi-transparent.



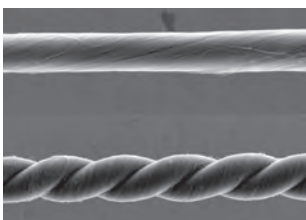
CNTs are aligned in the drawn direction. It is automatic. Length of each CNT is millimeter-scale but the web can go over than 10 m.



Doesn't need special tools to draw out the web. Just pinching out an edge of the CNT forest.



By twisting the web, it turns into a spun yarn.



Diameter of yarns in photos is 50 micron. Twisted structure is similar to conventional spun yarns. No chemical binder material is used, and so electrical and thermal conductivity, and flexibility are good.



Unidirectionally aligned CNT sheet is produced from CNT webs. High anisotropies in electrical and thermal conductivity. Free-standing robust sheet helps your work.

# OUR PRODUCTS



## Multi-walled carbon nanotube sheet

CNTs are unidirectionally aligned and no binder is used.



### Specifications

CNT diameter : 10-40 nm  
Purity : >95 %  
Anisotropy : Yes  
Sheet resistance :  $10 \sim 10^3 \Omega/\text{sq.}$   
Density : 0.3-2 g/m<sup>2</sup>  
Thickness : 0.5-4  $\mu\text{m}$

## Products

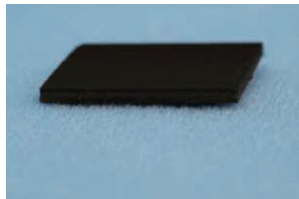
Product #	Width(mm)	Length(mm)
NTS0505	50	50
NTS1010	100	100
NTS1515	150	150
NTS2020	200	200
NTS2130	210	300

CNTs are aligned in the LENGTH direction of the sheet Maximum size is 300 x 420 (mm)



## Multi-walled carbon nanotube array

CNTs are vertically aligned on a substrate.



### Specifications

CNT diameter : 10-40 nm  
Purity : >98 %

## Products

Product #	CNT length(mm)	Substrate size(mm)
NTA05	0.5 $\pm$ 0.1	
NTA10	1.0 $\pm$ 0.1	
NTA15	1.5 $\pm$ 0.15	20 x 20
NTA20	2.0 $\pm$ 0.2	
NTA25	2.5 $\pm$ 0.25	
NTA30	3.0 $\pm$ 0.3	



## Drawable multi-walled carbon nanotube array

CNTs are vertically aligned on a substrate.  
A CNT web can be drawn from the CNT array.



### Specifications

CNT diameter : 10-40 nm  
Purity : >98 %

## Products

Product #	CNT length(mm)	Substrate size(mm)
NTAD10	1.0 $\pm$ 0.5	10 x 20



## Multi-walled carbon nanotube flake

Flake of Bundled CNTs. CNTs are just connected by van der Waals force.  
No binder material is used. It is not like powder form.



### Specifications

CNT diameter : 10-40 nm  
Purity : >95 %

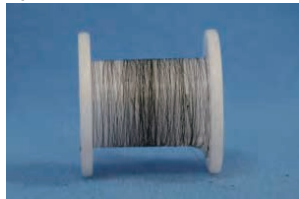
## Products

Product #	CNT length(mm)	Weight (g)
NTF01	1	
NTF02	2	25max.
NTF03	3	



## Multi-walled carbon nanotube yarn

A CNT web is spun into a twisted yarn. CNTs are connected by van der Waals forces. No binder material is used.



### Specifications

CNT diameter : 10-40 nm  
Purity : >98 %  
No binder material is used.

## Products

Product #	Yarn length(m)	Yarn diameter( $\mu\text{m}$ )	Resistivity( $\Omega\text{cm}$ )
NTY01	1	30-50	0.002-0.005
NTY10	10		

We are happy to prepare special products for you. We meet your request with our CNTs. Please contact us.

## Explorer the potential use of drawable, aligned, ultra-long carbon nanotube

Incubation Business Bldg. #311  
3-5-1 Johoku, Naka-ku, Hamamatsu 432-8561, Japan  
TEL +81-53-415-8085 FAX +81-53-415-8095  
E-mail [info@hamanics.com](mailto:info@hamanics.com)  
Web <https://www.hamanics.com/>



※The specifications are subject to change for improvements without notice.