Orchestrating a brighter world NEC

Nanocarbon technologies to achieve large-scale production

Carbon nanotube
Carbon nanohorn aggregate
Carbon nanobrush

- Semiconducting CNT ink for thin film transistor application was developed.
- Mass production technique of CNHs was developed and the product is on sale.
- Continuous preparation technology of carbon nanobrushes was developed.

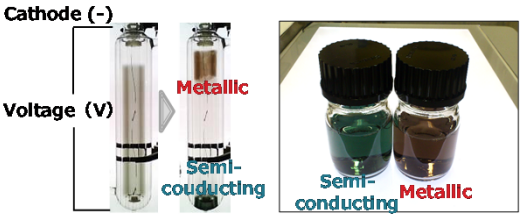
Carbon nanotube (CNT)

☐Separation technology of metallic- and semi-conducting CNT for thin film transistor application

➢ **Electric-field-induced layer formation (ELF)**

✓ Semi-conducting CNT of above 99%

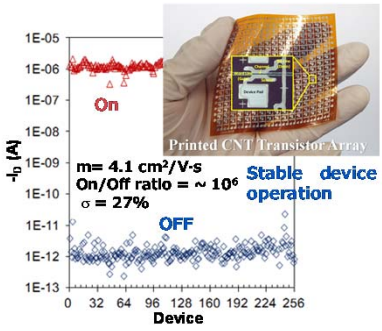
✓ Non-ionic surfactant: stable operation of device

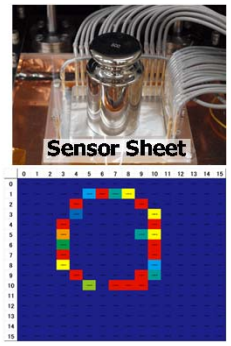


K. Ihara, et. al, J. Phys. Chem. C, 2011.

Application technology

☐Printed CNT transistor array with CNT ink





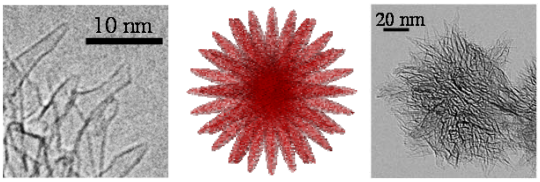
H. Numata, et. al, IEEE NANO 2016.

Carbon nanohorn aggregate

☐ **Uniform particle size** ☐ **Large surface area**

☐ **High dispersibility** ☐ **High purity · Safety**

☐ **Incorporation of various materials**



Application technology

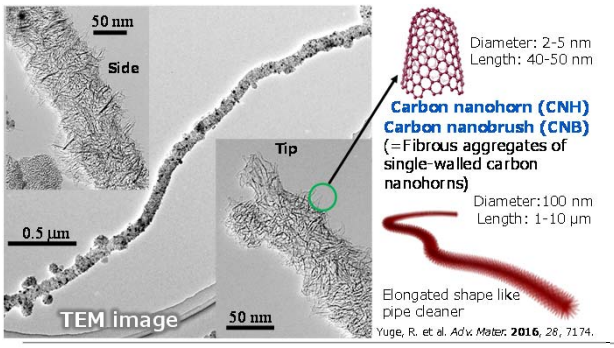
☐**Production rate of 100g/h (1kg/day)**

☐**Application for energy and medical field**

Large scale manufacturing equipment

	CNHs	Hole-opining CNHs
Purity	90% 10% (Graphite, a-C)	
Surface area	400 m²/g	1400 m²/g
Dispersibility	Hydrophobic	Hydrophilic
Conductivity	1.3 S/cm	1.2 S/cm

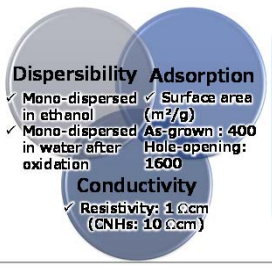
Carbon nanobrush (CNB)

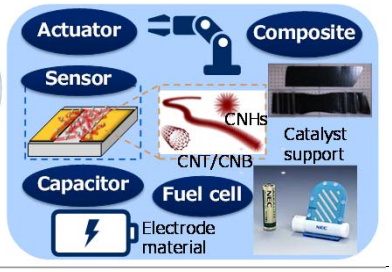


Application technology

☐ **Establishment of production method of 10g/day**

☐**Potential application for IoT and energy device**





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