

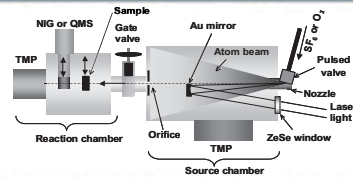
# Applications of carbon nano materials to frictional materials and micro channel

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## Hyperthermal atom beam

Simulator for hyperthermal atomic oxygen (8 km/s) in Low Earth Orbit (LEO: altitude 100~800km)

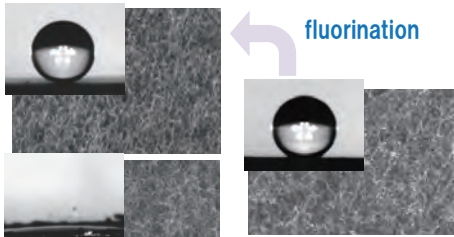


Laser plasma type hyperthermal atomic oxygen beam facility

Micro patterning Large area exposure  
Sub nm depth modification

## Nano surface modification

### Superhydrophobicity



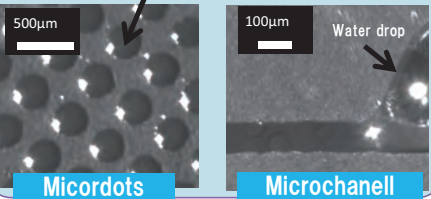
fluorination

Oxidation

### superhydrophilicity

### Micro patterning

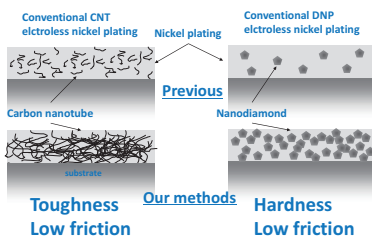
Wetting only in microdots



Micordots

Microchanell

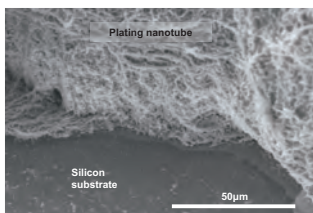
## Electroless nickel plating



Toughness  
Low friction

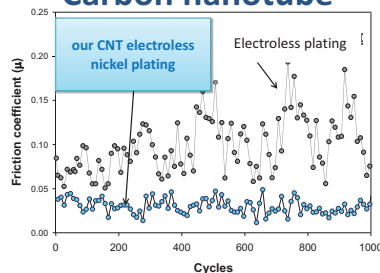
Our methods

Hardness  
Low friction



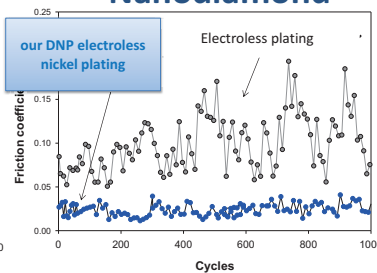
SEM image of our CNT electroless nickel plating

### Carbon nanotube



Friction data at contact pressure of 0.1GPa

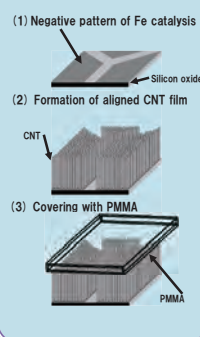
### Nanodiamond



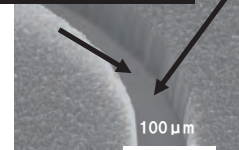
Friction data at contact pressure of 0.1GPa

## Microchannel of carbon nanotube

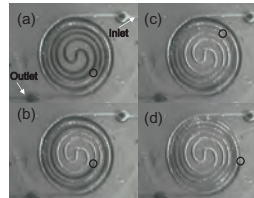
### Formation



Substrate (silicon oxide)



SEM image



Fernalt's spiral CNT microreactor (φ 5mm)

Wall (Carbon nanotube)

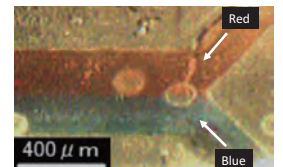
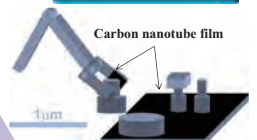
## Microtribology

Grip and break

→high friction

Releasing

→low adhesion



Y-junction type CNT

Our photo was used in cover page in CARBON

