# Fabrication of Transparent Conductive Film of Carbon Nanotube as Touch Panel Matrix Based on Flexible Sheet Material

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## 1 Introduction

◆Indium tin oxide (ITO) has been the transparent conductor of universal choice for touch screens.

❖Non-ideal, ever-increasing costs of scarce material on the earth

❖Tend to crack with use due to its brittle nature

❖Incompatible with plastic substrates such as polyethylene terephthalate (PET) due to its high-temperature processing

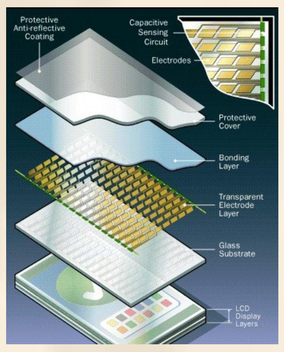
◆Novelly alluring alternative single-walled carbon nanotube (SWCNT) has been researched unprecedentedly over last two decades that stems from advantageous properties.

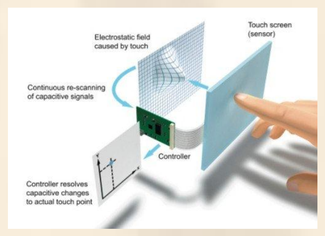
❖Abundant carbon resource in nature and sustainable

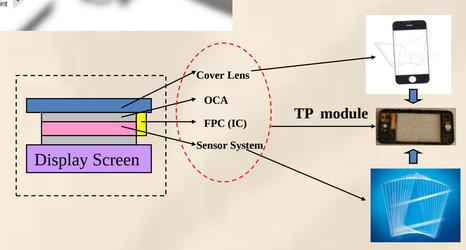
❖Excellent electrical conductivity and transparency

❖Superior mechanical strength (flexibility) and chemical resistance

❖Good adhesion with substrates and wet processing



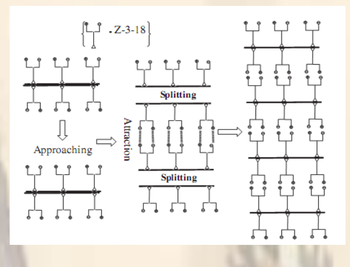

## 2 Methods

1 Individual dispersion of SWCNT as reported by our group

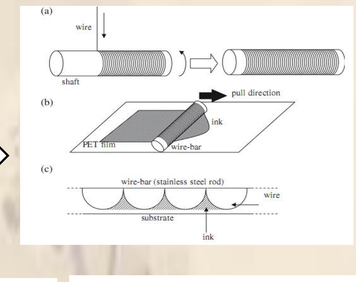
2 Using bar-coating route to prepare the transparent and conductive film

3 Removal of insulator by acid technique

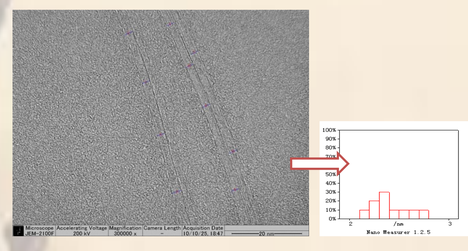
4 Post treatment of the obtained film



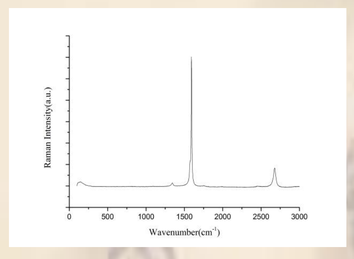

Devising a simple yet powerful method to disassemble the SWCNT bundles(ropes) into individual nanotubes

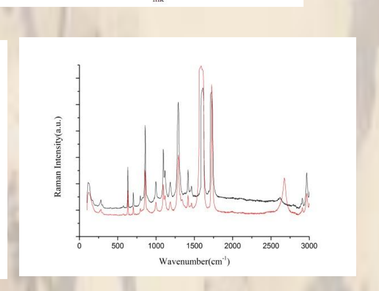






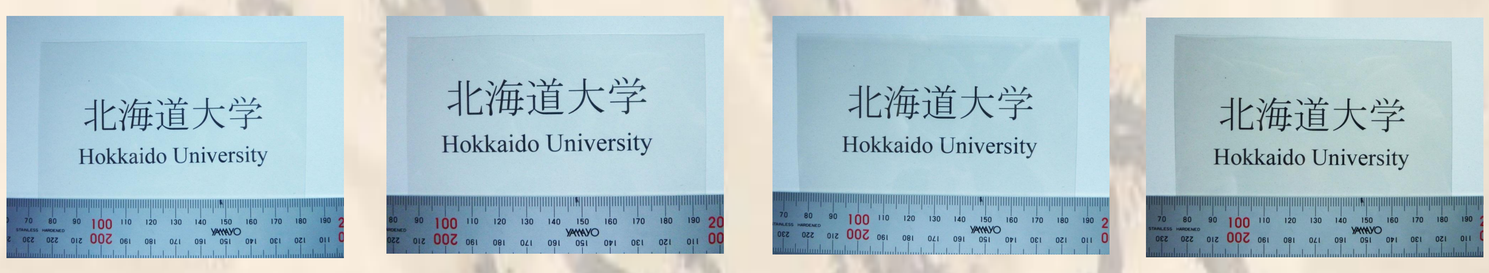
The ideal individual dispersion effect of SWCNT was produced as previous published work of our group



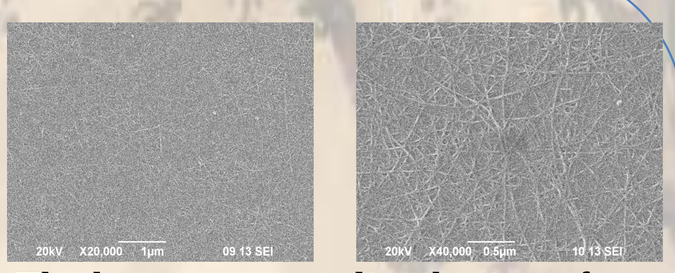




Raman response of dispersed SWCNT and SWCNT/PET(red line)

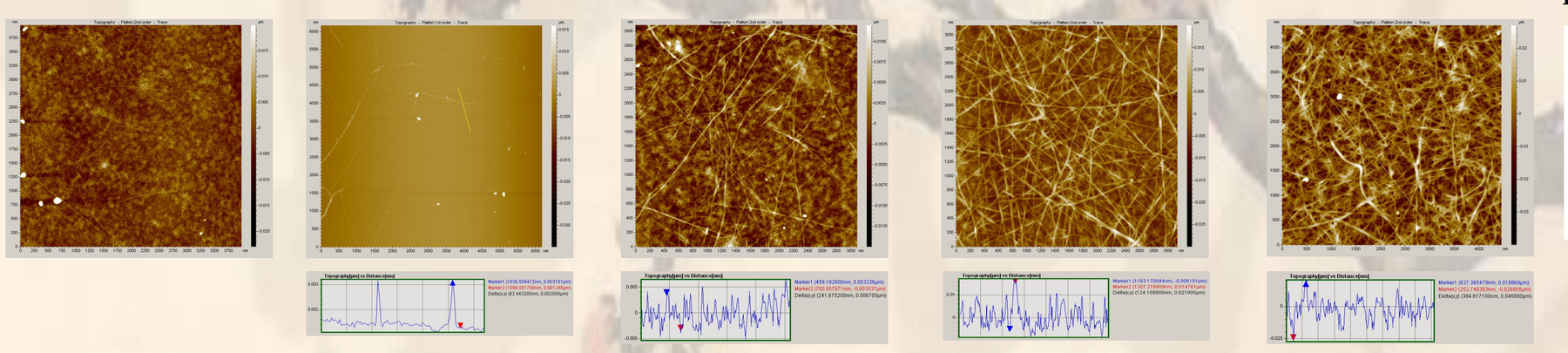
## 3 Results and discussion



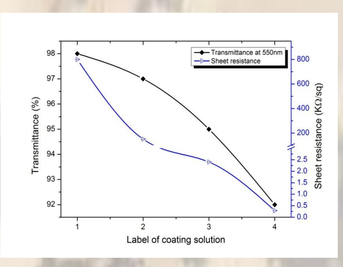

Photos of SWCNT/PET films with incremental concentration of dispersion solution 0.001wt%, 0.003wt%, 0.01wt%, 0.02wt%




The homogeneous distribution of SWCNT network coated onto PET substrate was portrayed by SEM.



Corresponding AFM images of prepared SWCNT/PET films showing the wavy fiber segments




Transparency and conductivity

## 4 Conclusions

1 Ideal individual dispersion of SWCNT

2 Highly electrically conducting thin films were prepared

3 Homogeneous feature make sure its transparency and post etching

## 5 References

1.Fugetsu Bunshi et al(2005) Disassembling single-walled carbon nanotube bundles by dipole/dipole electrostatic interactions. Chem Lett.34(9):1218-9.

2. Lee YH et al (2007)Effect of acid treatment on carbon nanotube-based flexible transparent conducting films. JACS.129(25):7758-9.

3. Bao ZN et al(2008) Self-sorted, aligned nanotube networks for thin-film transistors. Science.321(5885):101-4.