

## **Catalytic Growth of Carbon Nanotubes by chemical Vapour Deposition**

충남대학교 공과대학 재료공학과

최규석, 윤종만, 김도진

Since its discovery in 1991, the carbon nanotube has attracted much attention all over the world; and several methods have been developed to synthesize carbon nanotubes. According to theoretical calculations, carbon nanotubes have many unique properties, such as high mechanical strength, capillary properties, and remarkable electronical conductivity, all of which suggest a wide range of potential applications in the future.

Here we report the growth of aligned carbon nanotubes on Ni particles.

Carbon nanotubes were synthesized in the catalytic decomposition of acetylene at  $\sim 650^\circ\text{C}$  over Ni deposited  $\text{SiO}_2$ . For the catalyst preparation, Ni was deposited to the thickness of 100-300Å using effusion cell. and the sample were heated to  $400^\circ\text{C}$  for 4hr at the furnace to make Ni particle agglomerated at the range of  $\sim \text{A}$ .

The growth of carbon nanotube was carried out in a flow reactor. The reaction mixture of  $\text{H}_2$  and  $\text{C}_2\text{H}_2$  was passed over the catalyst bed at a rate of 200sccm and 300-1000sccm, respectively.

Long carbon nanotubes with length more than several  $\mu\text{m}$  and the carbon particles with round shape were obtained by CVD at  $\sim 650^\circ\text{C}$  on the Ni droplets. SEM micrograph showing carbon nanotubes grown under different conditions. also, alignment of carbon nanotubes was identified by SEM.

Finally, we performed TEM analysis on the carbon nanotubes to determine whether or not these film structures are truly carbon nanotubes, as opposed to carbon fiber-like structures.