
Nano Technology



Prof. Masaki Tanemura

Field: Materials Science, 1- & 2-D Nanomaterials, Surface Analysis, Scanning Probe Microscope

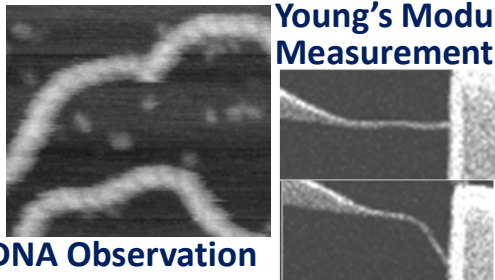
Research keywords: Low-Temperature Fabrication of Nanomaterials, In Situ Observation in Atomic Scale in TEM (transmission electron microscopy), Transparent & Flexible, Energy- & Bio-Applications

Dr. Tanemura has researched the room-temperature fabrication of carbon nanofibers and their applications to transparent flexible displays and nanoprobe as well as the in situ visualization of the growth of graphene nanoribbons and carbon nanotubes in atomic scale. The growth of 2-D nanomaterials are also being tackled.

Commercialized Nanocarbon Probe



Young's Modulus Measurement

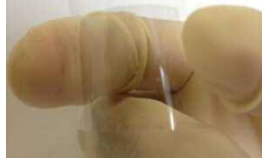


DNA Observation

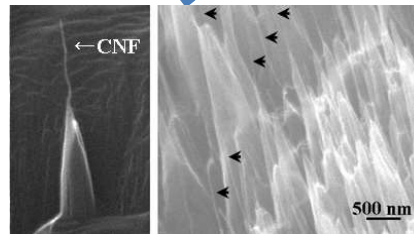
Display [1-4]



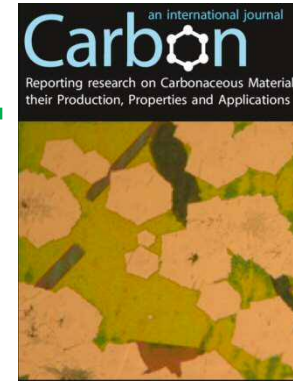
Electrode



"Transparent & Flexible" Device



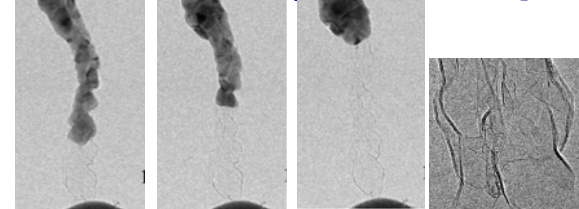
Room-Temperature Fabrication of Isolated and Densely Distributed 1-D Nanocarbon



Graphene Synthesis



In situ TEM of graphene growth [5, 6]



Awards:

[1] Encouragement Award from Japan Institute of Invention and Innovation (2013)

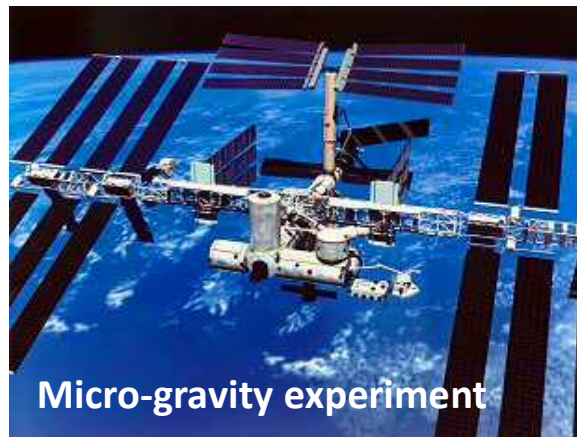
References:

- [1] M. Tanemura and S. P. Lau: "Flexible Field Emitters: Carbon Nanofibers" in "Carbon Nanotube and Related Field Emitters: Fundamentals and Applications" Wiley-VCH (2010), Chapt. 15; [2] P. Ghosh, et al., J. Am. Chem. Soc. 132 (2010) 4034; [3] D. Ghosh, et al., Physica Status Solidi-Rap. Res. Let. 7 (2013) 1080; [4] Z. Zulkifli, et al., Applied Surf. Sci. 356 (2015) 674. [5] M. Zamri, et al., ACS Nano, 6 (2012) 9567; [6] M. S. Rosmi, et al., Scientific Reports, 4 (2014) 7563..

2-D Nano-template

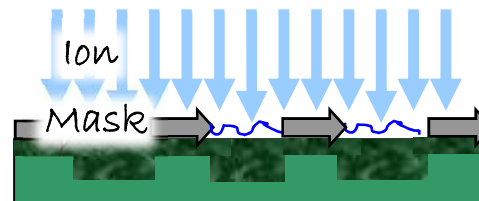
Prof. Takatoshi KINOSHITA, Prof. Osamu ERYU

This project is aiming at the development of novel materials utilizing micro-gravity environment in International Space Station, where convection, buoyancy, and sedimentation are free.



Preparation of a nano-periodical patterned polymer film at micro-gravity

Transcription of the nano-periodic structure on inorganic substrate



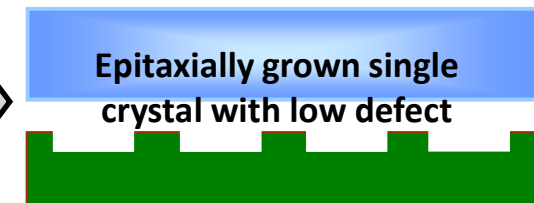
Surface treatment by ion implantation and chemical mechanical polishing

2-D Nano-template

Mass-production of Substrate with nano-scaled surface on the ground

Application of 2-D nano-template

e.g. Crystallization substrate with nano-scaled surface



Development of a high-performance semiconductor device

References :

- [1] T. Kinoshita et al., *Chem. Lett.*, 36, 562-563 (2007).
- [2] T. Kinoshita et al., *Chem. Commun.*, 46, 6983-6985 (2010).

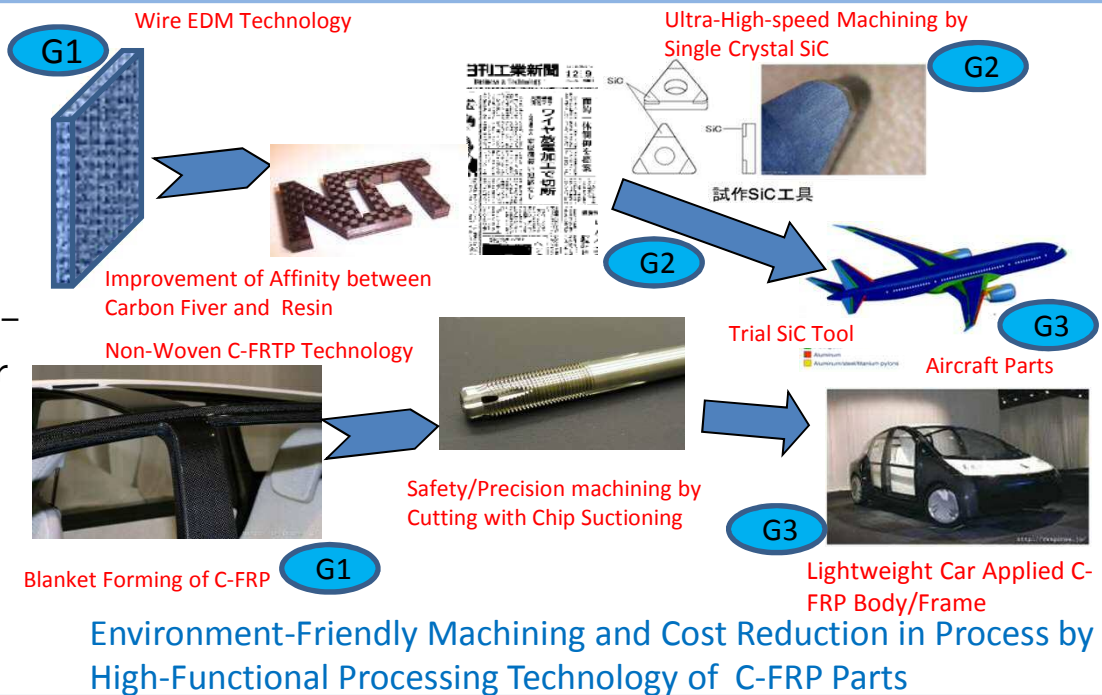
Development of Environment-Friendly Nano/Micro-Processing Technology Prof. Takashi NAKAMURA

The objective of the project is to establish unchallenged foundation for the development of the manufacturing industry in Aichi Prefecture using collaborative and combined research by almost all researchers and companies representing the production technologies in Aichi Prefecture. Prof. T. NAKAMURA is a leader of the project which consists of three groups. (http://p1.web.nitech.ac.jp/p1project/index_eng.html)

G1: Development of Material Processing Technology for Lightweight/High-Strength Automotive and Aircraft Parts

G2: Development of Ultra-Precision/High-Functional Processing Technology for Hard-to-Process Materials

G3: Development of Surface Modification and Joining Technology Using Combination of Dissimilar Materials



References:

- [1] Prevention of Depth-of-Cut Notch Wear in CBN Tool Edge by Controlling the Built-up Edge, International Journal of Automation Technology, Vo. 5, No. 3, pp. 342-347 (2011)
- [2] Effect of Bubble Coalescence on Material Removal Rate in Electrical Discharge Machining Process, International Journal of Electrical Machining, No. 16, pp. 33-39 (2011)
- [3] Enhancement of Eco-Friendly Machining Performance and Cleanliness of Machining Surroundings by Chip Suctioning, Proc. of the 3rd International CIRP High Performance Cutting Conference, pp. 329-336 (2008)