

Tuesday, September 23rd 2008, at 17.00
University of Padua – Palazzo del Bo, Great Hall

CONFERENCE of *Prof. Morinobu Endo*

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on

“Carbon Nanotubes: Current and Future Application, and Safety for Success”

The small but interesting one-dimensional carbon nanotubes consisting of a rolled graphene layer built from sp^2 units have attracted a lot of attention from the academy and the industry. With the availability of high-purity carbon nanotubes, prepared by a combination of a catalytic chemical vapor deposition¹ and the following thermal treatment at high temperature in argon, intensive and extensive efforts have focused on the development of practical usages of nanotubes exploiting their mechanical and electrical properties. The viability of carbon nanotubes strongly depends on their commercialization. From this point of view, firstly, the bulk synthesis of high-purity carbon nanotubes based on the floating reactant method² will be described. Secondly, their current usages in the range of multifunctional fillers in various matrix systems and in electrochemical systems³ will be discussed with a detailed study of the effect of nanotube texture and morphology. Finally, the potential toxicity of carbon nanotubes through the systemic study of various carbon nanotubes⁴ will be described in order to prevent a general public misunderstanding that might force the producer to stop the application of these interesting tiny materials to consumer products.

References

1. A. Oberlin, M. Endo, & T. Koyama, *Filamentous growth of carbon through benzene decomposition*, *J. Cryst. Grow.* 32, 335-349 (1976).
2. M. Endo, *Grow carbon fibers in the vapor phase*, *Chem. Tech.* 18, 568-576 (1988).
3. M. Endo, Y.A. Kim, T. Hayashi, K. Nishimura, T. Matushita, K. Miyashita, M. S. Dresselhaus, *Vapor grown carbon fibers (VGCFs): Basic properties and their battery applications*, *Carbon* 39, 1287-1297 (2001).
4. S. Koyama, M. Endo, Y.A. Kim, T. Hayashi, T. Yanagisawa, K. Osaka, H. Koyama, and N. Kuroiwa, *Role of systemic T-cells and histopathological aspects after subcutaneous implantation of various carbon nanotubes in mice*, *Carbon* 44, 1079-1092 (2006).

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RESUME



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Electrical & Electronic Engineering, Faculty of Engineering, Shinshu University
Date of birth: September 28, 1946
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EDUCATION

B.S., Dept. of Electrical Engineering, Shinshu University, Nagano-city, Japan (March 1969)

M.S., Dept. of Electrical Engineering, Shinshu University, Nagano-city, Japan (March 1971)

DEGREE

Ph.D. in Engineering, Nagoya University, Nagoya-city, Japan (1978)

Docteur D'Universite, U.E.R. De Science Fondamental et Appliquees, L'Universite D'Orleans (1975)

CAREER

Research Associate, Shinshu University (1972)

Lecturer, Shinshu University (1977)

Associate Professor, Shinshu University (1978)

Professor, Shinshu University (1990-)

Head of Cooperative Research Center Shinshu University (April 1993-March 1994)

Concurrent professor, Institute of Functional Materials Science, Kyushu University (January 1994-March 1994)

Head of Institute of Carbon Science & Technology, Shinshu University (2005-)

Concurrent professor, Institute of Multidisciplinary Research for Advanced Materials, Tohoku University (September 2005-March 2006)

Visiting Professor, Joining and Welding Research Institute Osaka University (April 2007-March 2008)

AWARDS

Carbon Society of Japan award from the Carbon Society of Japan (Japan, 1995)

Charles E. Pettinos Award from American Carbon Society (USA, 2001)

LEE HSUN Lecture Series Award from Institute of Metal Research (China, 2002)

Shinmai Award from Shinmai Bunka Foundation (Japan, 2003)

Ishikawa Award from Ishikawa Carbon Science Technology Promotion Foundation (Japan, 2003)

American Carbon Society Medal for Achievement in Carbon Science (shared, USA, 2004)

Honorary Professor, Beijing University of Chemical Technology (China, 2004)

The Minister of Education, Culture, Sports, Science and Technology Prize for contribution to Intellectual Cluster (Japan, 2005)

Honorary Citizen of Suzaka-city (Japan, 2006)

2006 Small Times™ magazine Best of Small Tech Lifetime Achievement Award (USA, 2006)

2007 Prize for Science and Technology (Research Category), the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology (Japan, 2007)

2007 Certificate of Commendation by the Governor of Nagano Prefecture (Japan, 2007)

Important Books:

• Intercalation of Graphite Fibers, Springer-Verlag, Berlin Heidelberg, 347-411, 1992.

• CARBON NANOTUBES: Elsevier Science Limited, 1-10, 105-110, 1996.

• The science and technology of carbon nanotubes, Editors by K. Tanaka, T. Yamabe and K. Fukui, Elsevier Science Ltd, Oxford, UK, 143-152, 1999.

• Potential Applications of Carbon Nanotubes, Carbon Nanotubes : Advanced Topics in the Synthesis, Structure, Properties and Applications, Springer, 13-49, 2007

Total: 42 books.

Important Papers in Refereed Journals:

• Journal of Crystal Growth, Vol.32, 335-349, 1976.

• CHEMTECH, American Chemical Society, September, 568-576, 1988.

• Science, Vol.264, 556-558, 1994.

• Physical Review B, Vol.58, No.14, 8991-8996, 1998.

Total: 309 refereed papers.

Main Research Field: Carbon Science and Application of novel carbon materials including nanocarbons.

Morinobu Endo was born in Suzaka city, which is located near the center of Japan's main island.

He studied electrical engineering at Shinshu University in Nagano, Japan, and obtained his PhD in 1975 from the University of Orleans, France. It is in his PhD work that he has developed the synthesis method of carbon nanotubes, and showed that it was a tubular structure for the first time.

In 1990, he became professor of the Department of Electrical and Electronic Engineering, Shinshu University. In 1994, he held the concurrent professorship at Institute of Functional Materials Science, Kyushu University for four months. From September 2005 to March 2006, he held the concurrent professorship at the Institute of Multidisciplinary Research for Advanced Materials, Tohoku University. Main interests are science and application of nanocarbons such as carbon nanotubes, and the development of high-performance energy storage devices such as Lithium ion battery, electric double layer capacitor, and fuel cell.