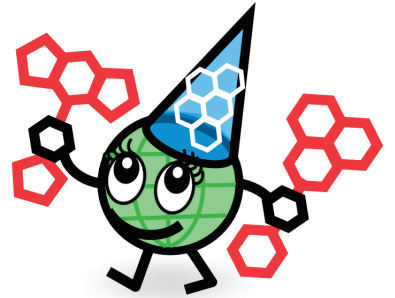


# Nanoelectronics World Created with Carbon Materials

Fujitsu introduces synthesis technology of novel nano-carbon materials including carbon nanotubes and graphene, and the devices to which it can be applied. We also show our endeavors in the world of next-generation environment-conscious nanoelectronics. In addition, our collaborators of universities and independent administrative institutions show details of their advanced research.



## Main features

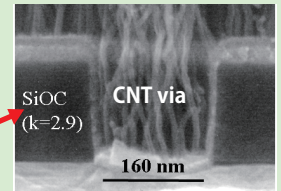
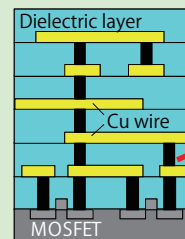
The lecture program is on the reverse.

### Carbon Interconnect

#### CNT and Graphene Interconnect for Future LSIs

Fujitsu is working on carbon nanotube (CNT) interconnect technologies, which use metallic CNTs. The aim is to solve problems associated with LSI interconnects in the half-pitch 32-nm node and beyond. These technologies, which have been led by Fujitsu, are now being developed for practical use at a semiconductor consortium, Selete, supported by the NEDO MIRAI project. Members of the program include Fujitsu, Toshiba, Panasonic, Renesas Technology, Ulvac and Waseda University.

Fujitsu has also started to study horizontal interconnect technologies using graphene, supported by the JST CREST project.  
(Co-exhibitor: Selete, Tohoku Univ.)

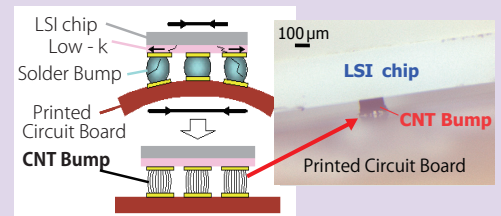


The work was partly completed under Selete management as part of the MIRAI project supported by NEDO.

### Carbon-based Assembling and Heat Dissipation

#### CNT Bumps for Future LSIs and High-Power Amplifiers

Carbon nanotubes (CNTs) have many advantages such as high thermal conductivity, and excellent mechanical strength and flexibility. Fujitsu is developing flexible and thermal assembling technologies utilizing CNT bumps. One such technology relates to CNT flexible bumps for flip-chip LSI interconnects, which can absorb the mechanical stress between an LSI chip and a PCB. Another technology is to do with CNT thermal bumps for high-power RF amplifiers, which can achieve effective heat dissipation and high gain simultaneously at a high frequency.  
(Co-exhibitor: Mitsubishi Gas Chemical Company)



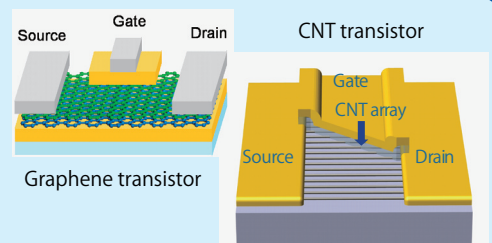
The work was partly completed by collaborative project with Mitsubishi Gas Chemical Company Inc. supported by NEDO.

### Carbon Transistor

#### Graphene and CNTs as a Transistor Channel

Electrons in graphene and carbon nanotubes (CNTs) can travel more than 10 times faster than those in Si. Therefore, a very high-speed and/or low-power transistor can be realized using such carbon materials as a channel. In the exhibition, we introduce such graphene and CNT transistors, and CNT-based sensors.

(Co-exhibitors: Osaka Univ., Nagoya Univ., Kyushu Univ., NIMS)



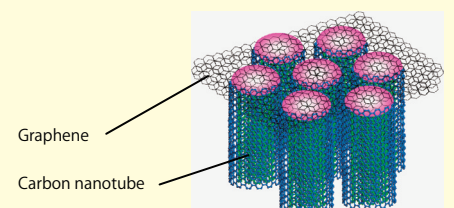
Mizutani Lab., Nagoya Univ.

### Synthesis of Nano-carbon Materials

#### Novel Nano-carbon Composite Structure

Fujitsu introduces state-of-the-art synthesis technologies including carbon nanotubes (CNTs), graphene, and a self-organized composite structure consisting of aligned CNTs and graphene multi-layers. Fujitsu puts special emphasis on synthesis technologies compatible with device applications.

(Co-exhibitor: AIST)



# Lecture Program

\*Language is Japanese.

CNT: Carbon Nanotube

Time	Title
Wed. 18	11 : 10 Nanoelectronics World Created with Carbon Materials Senior Research Fellow Yuji AWANO
	<b>Invited</b> 13 : 10 CNT Growth — Horizontal Alignment Institute for Material Chemistry and Engineering, Kyushu University Associate Professor Hiroki AGO
	<b>Invited</b> 14 : 10 CNT Sensor Institute of Scientific and Industrial Research, Osaka University Professor Kazuhiko MATSUMOTO
	15 : 10 CNT Assembling and Heat Dissipation Senior Researcher Taisuke IWAI
	16 : 10 Carbon Interconnect Senior Researcher Mizuhisa NIHEI
Thu. 19	11 : 10 CNT Assembling and Heat Dissipation Senior Researcher Taisuke IWAI
	<b>Invited</b> 13 : 10 CNT Super-Growth Nanotube Research Center, AIST Group Leader Dr. Kenji HATA
	<b>Invited</b> 14 : 10 CNT Transistor Department of Quantum Engineering, Nagoya University Professor Takashi MIZUTANI
	15 : 10 Synthesis of CNT and Graphene Composite Structure Senior Researcher Shintaro SATO
	16 : 10 Nanoelectronics World Created with Carbon Materials Senior Research Fellow Yuji AWANO
Fri. 20	11 : 10 Synthesis of CNT and Graphene Composite Structure Senior Researcher Shintaro SATO
	12 : 10 Carbon Interconnect Senior Researcher Mizuhisa NIHEI
	<b>Invited</b> 13 : 10 Graphene Growth Institute of Multidisciplinary Research for Advanced Materials, Tohoku University Associate Professor Yuji TAKAKUWA
	<b>Invited</b> 14 : 10 Graphene FET International Center for Materials Nanoarchitectonics, NIMS Principal Investigator Dr. Kazuhito TSUKAGOSHI
	15 : 10 Nanoelectronics World Created with Carbon Materials Senior Research Fellow Yuji AWANO

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