

KYOTO

Kyoto Nano-Technology Cluster

Outline of the Project

Three major universities in Kyoto city, Kyoto University, Kyoto Institute of Technology, and Ritsumeikan University, which have been developing futuristic nano-technology, have agreed to promote research activities in collaboration with local corporations having unique high-technology. This is a unique collaborative effort among university research laboratories and industries in Kyoto which aims to venture into new eras of business involving nano-technologies and / or nano-materials leading to the creation of leading edge materials and devices. The goal of these regional efforts is to enrich the technology basis and manufacturing capabilities of Kyoto industries. The significance of the collaboration lies in the centralized management of the advanced research institutes with common interests concerning nano-technological pursuits, and accelerated technical transfer to industry through interactive operations.

Members of the Headquarters

- President..... HORIBA Masao (Special Brain Trustee, Advanced Software Technology & Mechatronics Research Institute of Kyoto)
- Project Director..... TASAKI Hisashi
- Research Director..... MATSUSHIGE Kazumi (Prof., Graduate School of Engineering, Kyoto Univ. Director, International Innovation Center, Kyoto Univ.)
- Science and Technology Coordinator..... SUZAWA Osamu
IMADA Akira
OHURA Takahiko

Central Project Organization Advanced Software Technology & Mechatronics Research Institute of Kyoto

Core Institute(s) Kyoto Univ. : International Innovation Center, Venture Business Laboratory, Int'tech Center, Kyoto Univ.-KATSURA, Graduate School of Engineering
Kyoto Institute of Technology : Cooperative Research Center
Ritsumeikan Univ. : Research Organization of Science and Engineering

Participants Industry...Rohm Co.,Ltd., Horiba, Ltd., Samco International Inc., Kyoto Instruments Co.,Ltd., Nissin Ion Equipment Co.,Ltd., Kyocera Corporation, Shimadzu Corporation, Dainippon Screen Mfg. Co.,Ltd., Omron Corporation, Sixon Ltd., X-ray Precision, Inc., Ion Engineering Research Institute Corporation, Nano Device And System Research Incorporated, Towa Corporation, Shinwa Chemical Industries, Ltd., Teramecs Co.,Ltd., Abel Systems Incorporation

Institute...Kyoto Univ., Kyoto Institute of Technology, Ritsumeikan Univ.

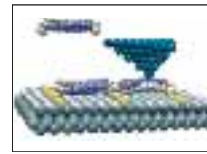
Main Researchers MATSUSHIGE Kazumi (Prof., Graduate School of Engineering, Kyoto Univ. Director, International Innovation Center, Kyoto Univ.)
FUJITA Shizuo (Prof., International Innovation Center, Kyoto Univ.)
KIMURA Yoshiharu (Prof., Faculty of Textile Fibers, Kyoto Institute of Technology Director, Cooperative Research Center, Kyoto Institute of Technology)
HIOKI Kouichiro (Prof., Graduate School of Economics, Kyoto Univ.)

Outline of Researches

●Fundamentals of Nano-technology and Advanced Nano-processing

The research will be conducted in the areas of probing, manipulation and processing in the fundamental nano-technology fields. By establishing these fundamental technologies we will develop application research such as the development of new electronic materials, intelligent elements, and nano-level measurement in biotechnology.

[Kyoto Univ., Kyoto Institute of Technology, Ritsumeikan Univ.,
Nissin Ion Equipment Co.,Ltd., Rohm Co.,Ltd., Kyocera Corporation, Horiba, Ltd.,
Shimadzu Corporation, Dainippon Screen Mfg. Co.,Ltd., Kyoto Instruments Co.,Ltd.,
Towa Corporation]



Probe technology



Nano processing

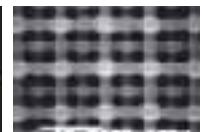
●Developing Next Generation Light Sources, and Electronic Devices

By using electronic materials represented by semiconductors, new techniques will be developed to create structures controlled at a nanometer level such as columns and discs (dots) of 5 to 30nm in diameter. With such structures, we will be able to obtain the physical characteristics never before studied. We will also be able to obtain the methodology to build (from the bottom up) atoms and molecules by controlling them intentionally. This technology will be used to cultivate semiconductors, and create novel semiconductor materials that can withstand high temperatures and high voltages. Making good use of these new structure and materials, we will develop light sources and electronic devices of ultra-compact, ultra-high speed, ultra-high efficiency, and even those with functionalities that do not exist today.

[Kyoto Univ., Kyoto Institute of Technology,
Ion Engineering Research Institute Corporation, Sixon Ltd., Samco International Inc.,
Kyocera Corporation, Abel Systems Incorporation, Omron Corporation, X-ray Precision, Inc.,
Rohm Co.,Ltd.]



Development of novel lighting systems



Photonic structure



Nano-machine system

●Nano-bio Integrated Devices

Establishing new methodologies in semiconductor techniques to recognize genes, and integrating them with NEMS (Nano Electronic Machine System) technology, we will develop nano-bio integrated technologies such as inexpensive and high performance DNA chips to be used for gene diagnosis.

[Kyoto Univ., Kyoto Institute of Technology, Ritsumeikan Univ., Teramecs Co.,Ltd., Shinwa Chemical Industries, Ltd.,
Nano Device And System Research Incorporated, Horiba, Ltd.]

●The Creation of New Social Business Entities (MOT and Technology Trust)

This research is being conducted to determine how intellectual support should be furnished to realize nano-technology businesses. Since a single technique in nano-technology cannot cover whole manufacturing process particular study will be required for the entrusting system to combine and mobilize various techniques. Further study will be also required for the development of educational tools on MOT (Management of Technology) by which a new enterprise can be started through nano-technology, and for the establishment of the training system which will produce staff who have enough ability or skill to adopt the most suitable business plan according to a given technological environment.

[Kyoto Univ., Kyoto Institute of Technology, Ritsumeikan Univ.]

Expected Results

- Atomic and molecular level processing and control
- In-vivo based cell analyzer
- Miniaturized; Long life; Low consumption; Innovative light sources
- Extra-thin foldable displays
- Framework of nano-technology based Technology Trust