Nano Device and System Research, Inc.orporation

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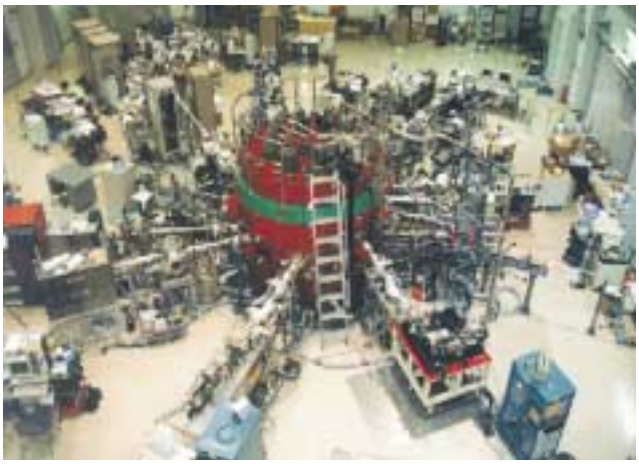
COO

1. The Challenge of Micro- and Nanomachine Technology

Nano Device and System Research, Inc.orporation (NanodeS) is a venture company established on April 2, 2001. A primary activity of Nanodes is to cultivate applications based on the development of practical micromachine (MEMS) technologies. NanodeS also plans to pursue nanodevices, which are anticipated to be a key technology of the 21st century. Susumu Sugiyama, the CEO of NanodeS who serves concurrently as a professor at Ritsumeikan University and is a specialist in MEMS, has been working closely with the university on nanodevice research. Professor Sugiyama has achieved nanolithography using the university's synchrotron for irradiating soft X-rays. By making good use of this technology, it will be possible to develop devices capable of functioning at nano level.



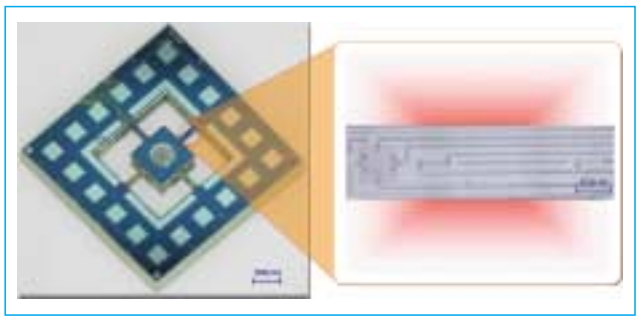
The synchrotron at Ritsumeikan University, having a peak wavelength of 1.5 nm

2. Micro- and Nanomachine Technology

MEMS can be broadly categorized as sensors incorporating signals from the environment and the like and actuators for driving something. Because current sensors can achieve functionality through a more simple construction than actuators, there have been more advances in the development of sensors. Our company has also focused on the development of sensors. Specifically, sensors include accelerometers, biosensors, and pressure sensors.

(1) Developing Applications for Existing MEMS

NanodeS is primarily focusing on MEMS devices researched at Ritsumeikan University and their application development. At present, we have nearly completed the development of a six-axis accelerometer and are now searching for partners to conduct joint research aimed at the commercialization of these sensors. Due to its ability to sense rotational movement in particular, this accelerometer is most suitable for use in robotic arms performing complex movements, or in fluid sensors. Capturing subtle human movements may also be feasible.



Six-axis accelerometer developed at Ritsumeikan University

(2) Developing Nanodevices

Although fine machining at nano has been achieved through X-ray lithography using a synchrotron, NanodeS is attempting to develop a nanogap biosensor. A biochip sensor grips a single strand of DNA within a nanogap and evaluates the electrical characteristics of the strand by applying an electrical bias.

3. Future Challenges

Products are employed in closer proximity to our bodies as the functional dimensions of the products grow smaller, as in the progression of buildings on the order of meters, automobiles on the order of centimeters, home appliances on the order of millimeters, and computers and cell phones on the order of micrometers. So what will happen when we make the next step to nanometers? Perhaps products on this order will cross the periphery of our bodies and be used therein, as in the field of drug delivery systems, for example. Certainly sensors capable of monitoring activity in living bodies like this will flourish in the next generation. While current techniques focus on extracting biological tissue and materials for measurements, future sensors will be capable of performing direct and noninvasive measurements of living body tissue. It is for this that we are preparing.