

Precise morphology measurement of nanostructures

Reference material for atomic force microscope (AFM) and precise morphometry

A cantilever with a sharp tip is one of the key components of the atomic force microscope (AFM), and it is the origin of artifacts in AFM images. A probe characterizer for AFM was developed to analyze the accurate probe-shape. A reference material, which includes accurate lines and spaces, was developed using multilayer-thin films. Lines and spaces ranging from 5 nm to 100 nm can be fabricated using a multi-layer film structure. The comb-shape grating was developed for correcting AFM images. Apparent probe shapes can be determined under various experimental parameters, and actual probe shape can be obtained under optimized set-points of force and feedback parameters. As a result, reliability of AFM images can be improved significantly.

Hiroshi Itoh

Research Institute of Instrumentation
Frontier

h.itoh@aist.go.jp

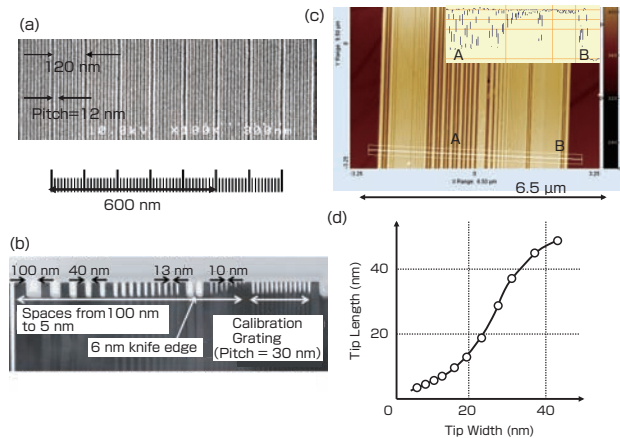
AIST TODAY Vol.10 No.8 p.11 (2010)

(a) Scanning electron micrograph of periodic grating for calibrating non-linearity of scanning system

(b) Transmission electron micrograph of AFM probe-shape characterizer

(c) AFM image of comb-shape grating

(d) Probe characteristic for quantitative analysis



In Brief

President Nomakuchi talks at IASP 2010 Daedeok

The 27th IASP World Conference on Science and Technology Parks (IASP 2010 Daedeok) was held by the International Association of Science Parks (IASP) on May 24-26, 2010, in Daejeon, Korea.

AIST President Tamotsu Nomakuchi gave an invited lecture titled "AIST as an Innovation Hub of Industrial Science and Technology for a Sustainable Society", presenting activities in photovoltaics, Tsukuba Innovation Arena for Nanotechnology (TIA nano), and international industrial standardization as three examples of AIST open innovation. IASP is a nonprofit international association established in 1984 with the objective of creating a global network of science parks around the world and of promoting exchange and cooperation. There are presently 380 organizations from 72 countries belonging to the association. To this conference, 1200 people from 57 countries participated, and there were active discussions, with the main theme "global green development to overcome climate change, environmental and energy problems". Korean Prime Minister Chung Un-Chan attended the

opening ceremony, participated in the ribbon cutting with AIST President Nomakuchi, and the two had an opportunity for friendly talks. Director Kozo Uto of AIST Kyushu, and Director Koichi Sakuta of the International Affairs Department, AIST, also attended, and presented AIST's activities toward the realization of a low carbon society.



AIST President Nomakuchi giving an invited lecture at IASP 2010 Daedeok

MOU Concluded with CEA-DRT, France at INC6 in Grenoble

At the 6th International Nanotechnology Conference on Communications and Cooperation (INC6) held on May 17-20, 2010 in Grenoble, France, AIST President Tamotsu Nomakuchi gave the opening speech as the chairperson of the organizing committee. To this conference, 130 participants attended from around the world principally from the US, Europe, and Japan. The next seventh conference was officially decided to be held in Tsukuba in May, 2011.

The French Alternative Energies and Atomic Energy Commission - Technology Research Directorate (CEA-DRT) and AIST are public research organizations of the largest scale in their countries, are very similar in the number of researchers, research topics, and objectives, and cover a large research area from basic research to applied research. On May 17, during INC6, AIST concluded a memorandum of understanding on comprehensive research

cooperation (MOU) with CEA-DRT which is leading in industrial technology in the fields of nanotechnology and energy.

AIST is working on the establishment of “Tsukuba Innovation Arena for Nanotechnology (TIA nano)”, a global research center for nanotechnology, in cooperation with the National Institute for Materials Science and the University of Tsukuba. CEA-DRT, on the other hand, has formed MINATEC (Micro and Nanotechnologies Innovation Campus), a global center that covers universities, businesses, and research organizations, in Grenoble, France. The two organizations have been exchanging researchers and executives, and have held workshops in research fields such as diamond, MEMS, and optical storage. The conclusion of MOU is to further strengthen and develop the cooperation between the two organizations.



AIST President Nomakuchi addressing INC6



CEA-DRT Director Jean Therme (right) and AIST President Nomakuchi signing the MOU between the two organizations

U.S.-Japan Workshop on Basic Science Project Development

The U.S.-Japan Workshop on Basic Science Project Development was held on June 2-4, 2010, at Sandia National Laboratories in New Mexico, US. The objective was to confirm the progress of research cooperation in basic sciences and renewable energy technology of the Japan-U.S. Clean Energy Technologies Action Plan and to discover and consider new issues for cooperation. The Action Plan is part of the Japan-U.S. cooperation project for research and standardization of Clean Energy Technologies, a project commissioned by the Ministry of Economy, Trade and Industry (METI).

On the Japan side, 23 people participated including Director Hiroshi Yamagata of the International Affairs Office, Industrial Science and Technology Policy and Environment Bureau, METI, AIST Vice-President Akira Yabe, AIST Research Coordinator Yoshiro Owadano, staff of International Affairs Department, AIST, and 14 researchers of AIST (4

were staying long-term in the US). From the US side, there were over 40 participants including Senior Policy Advisor/ Japan Kay Thompson, Office of European and Asian Affairs, Department of Energy (DOE), Director Robert Q. Huang of DOE Center for Integrated Nanotechnologies (CINT), and 35 researchers from 9 laboratories under DOE. Besides the general meeting, researchers were mainly divided in groups of 7 research fields (artificial photosynthesis, dye-sensitized photocells to generate hydrogen, novel energy storage or conversion devices utilizing nanotechnology, hydrogen storage materials, fuel cells, computational science for energy related materials, biofuels). There were exchange of opinions and discussions on individual research cooperation themes. Based on these activities, there is expectation for progress in further discussion among researchers and for acceleration for each topic of cooperation to take form.



General meeting of the workshop



Individual session