Professor Toshiyuki Tsuchiya

Toshiyuki Tsuchiya received the M.S. degree from the University of Tokyo, Japan, and Ph.D. degree from Nagoya University, Japan, in 1993 and 2004, respectively. He worked with Toyota Central Research and Development Laboratories from 1993 to 2004. In 2004, he joined Kyoto University as an Associate Professor and now belongs to the Department of Micro Engineering, Kyoto University, Japan. He is currently engaged in the research of silicon micromachining, its application in MEMS, the mechanical property evaluation of micro materials, and the reliability of MEMS devices. He has been involved in several conferences and workshops dealing with MEMS and microsystems, including the International Conference on Solid-State Sensors and Actuators (Transducers), the international conference on Micro Electromechanical Systems (MEMS), Asia-Pacific Conference of Transducers and Micro-Nano Technology (APCOT) and many domestic conferences. He was a general chair of the IEEE MEMS 2013 in Taipei. He is is an Editorial Board Member of Journal of Micromechanics and Microengineering, Institute of Physics Publishing and Micro & Nano Letters, the Institute of Engineering and Technology. He was honored with R & D 100 Award for research in “Thin film Tensile Tester” in 1998 and IEC 1908 Award in 2012 by the International Electrotechnical Commission. Dr. Tsuchiya is a member of IEEE, MRS, the Institute of Electrical Engineers of Japan, the Japan Society of Applied Physics and the Japan Society of Mechanical Engineers.

Keynote Speaker

MEMS Fabricated Large-Area Nanogap for Future Energy Devices

Abstract

Nsanogaps, in which the gap distance is smaller than 10 nm, are attracted great attentions to realize high performance small energy device by adopting quantum effects, such as electron tunneling effect, Casimir effect and thermal proximity effect. To handle large amount of energy, large-area nanogap is required, but it is difficult to create that of few micrometer square in its area. We have proposed a new method to fabricate conformal nanogaps by “fracture fabrication” using cleavage of single crystal materials. Though its fabrication process is simple, conformal gap with atomically smooth surfaces is inherently created. The fracture fabrication of nanogaps and their properties measurement using microelectromechanical system (MEMS) device and future applications will be presented and discussed. Also, in this talk, the nation-wide open nanofabrication facilities in Kyoto University for nanotechnology research and development will be introduced.