

Guest Editorial

Special Issue on Plasma-Based Surface Modification and Treatment Technologies

THIS SPECIAL Issue is the second one published in the IEEE TRANSACTIONS ON PLASMA SCIENCE following our success in 2006. Plasma-based surface modification and treatment continues to attract tremendous attention in a wide variety of research and commercial applications in aerospace, biomedical engineering, metallurgy, polymers, semiconductors, nanotechnology, and so on. By using the appropriate plasma-based techniques, various surface mechanical, chemical, and biological properties can be selectively enhanced or altered while retaining the favorable bulk attributes of the materials such as strength and inertness. This rapidly evolving field is a point of focus in many international conferences such as Ion Beam Modification of Materials, Surface Modification by Ion Beams, Plasma Surface Engineering, and particularly the biennial Plasma-Based Ion Implantation and Deposition workshops. The IEEE International Conference on Plasma Science has also seen an increasing number of papers in this area. Therefore, another Special Issue reporting recent advances in this important research area is of great interest to the readers of the transactions.

Similar to our previous Special Issue published in 2006, the intent of this Special Issue is to present new results and developments, as well as novel methods and studies, in this exciting and technologically important area that also has tremendous industrial relevance. The areas covered include physics and modeling of plasma-surface interactions; plasma instrumentation such as plasma sources and power modulators;

plasma-based deposition techniques; plasma immersion ion-implantation and hybrid implantation–deposition technologies; medical, biological, metallurgical, aerospace, and environmental applications; plasma surface treatment of insulators and large industrial components; characterization of plasma-treated surfaces; fabrication of novel microelectronic and photonic structures and devices using plasma-based techniques; as well as plasma-based doping of semiconductors. We are very excited about the diversity and high quality of papers submitted to and published in this Special Issue. We would also like to thank Dr. S. J. Gitomer for working with us to make this Special Issue a reality and A. Larkin for administrative support.

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Dr. Chu is a member of the Plasma-Based Ion Implantation and Deposition International Committee, Ion Implantation Technology International Committee, IEEE Plasma Science and Applications Executive Committee, and IEEE NPSS Fellow Evaluation Committee. He is a Fellow of the APS, AVS, and Hong Kong Institution of Engineers. He is a Senior Editor of IEEE

TRANSACTIONS ON PLASMA SCIENCE and Associate Editor of *Materials Science and Engineering Reports* and *International Journal of Plasma Science and Engineering*. He was the recipient of a number of awards, including the 2007 IEEE NPSS Merit Awards.



Ken Yukimura (M'99) was born in Nagasaki, Japan, in 1948. He received the B.Eng., M.Eng., and Dr.Eng. degrees in electrical engineering from Doshisha University, Kyoto, Japan, in 1970, 1972, and 1977, respectively.

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a Cochairperson of the Fifth International Workshop on Plasma-based Ion Implantation (Kyoto, Japan, December 1999). He was a Guest Editor of a Special Issue relevant to plasma-based surface-modification and treatment technologies in the IEEE TRANSACTIONS ON PLASMA SCIENCE (IEEE TPS) from 2005 to 2006.



Xiubo Tian received the B.S. and M.S. degrees in materials science and engineering from Harbin Institute of Technology, Harbin, China, in 1990 and 1993, respectively, and the Ph.D. degree in physics and materials science from City University of Hong Kong, Kowloon, in 2002.

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Dr. Tian is a governing board member of the Chinese Vacuum Society, where he is also a committee member of the Thin Film Section, and a committee member of the Surface Engineering Section of the Chinese Mechanical Engineering Society.