

# Guest Editorial

## Special Issue on Plasma-Based Surface Modification and Treatment Technologies

**T**HIS Special Issue is the first of its kind published in the IEEE TRANSACTIONS ON PLASMA SCIENCE. Plasma-based surface modification and treatment is a burgeoning area and has attracted much attention in a wide variety of research and commercial applications in aerospace, biomedical engineering, metallurgy, polymers, semiconductors, and so on. By using the appropriate techniques, surface properties such as wettability, hardness, and bioactivity can be selectively enhanced 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 (IBMM), Surface Modification by Ion Beams (SMMIB), Plasma Surface Engineering (PSE), and in particular, the biennial Plasma-Based Ion Implantation and Deposition (PBII&D) workshop. The IEEE International Conference on Plasma Science (ICOPS) has seen an increasing number of papers in this area as well. Therefore, we believe that a special issue focusing on this topic will be of great interest to the readers of this TRANSACTIONS.

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 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 large number and high quality of papers submitted to the Special Issue.

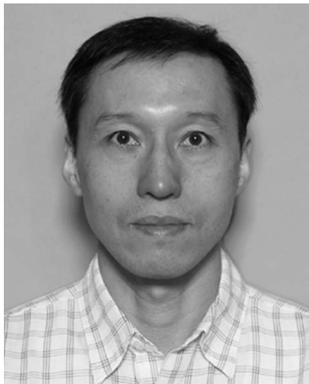
The Guest Editors would like to thank Dr. S. J. Gitomer for working with us to make this special issue a reality and A. Larkin for administrative support.

PAUL K. CHU, *Guest Editor*  
Materials Engineering, Department of  
Physics and Materials Science,  
City University of Hong Kong,  
Kowloon, Hong Kong

KEN YUKIMURA, *Guest Editor*  
Faculty of Engineering,  
Doshisha University,  
Kyoto 602-8580, Japan

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**Paul K. Chu** (F'03) received the B.S. degree in mathematics from The Ohio State University, Columbus, in 1977 and the M.S. and Ph.D. degrees in chemistry from Cornell University, Ithaca, NY, in 1979 and 1982, respectively.

He joined Charles Evans & Associates in California after graduation and later founded Evans Asia. He joined City University of Hong Kong, Hong Kong, in 1996 and is currently a Professor (Chair) of materials engineering with the Department of Physics and Materials Science. His research activities are quite diverse, encompassing plasma surface engineering and various types of materials and nanotechnology. He is the editor of two books and has written more than ten book chapters, 450 journal papers, and 500 conference papers. He is the holder of eight U.S. and three Chinese patents.

Prof. Chu is a Fellow of the AVS and HKIE. He is a Senior Editor of the IEEE TRANSACTIONS ON PLASMA SCIENCE and a Guest Editor of *Surface and Coatings Technology*. He also serves as a Member of the Editorial Board of *Materials Science and Engineering Reports* and *Nuclear*

*Instruments and Methods in Physics Research B*. He is the Chairman of the International Plasma-Based Ion Implantation Executive Committee and a Member of the International Ion Implantation Technology Executive Committee.



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

He was with the Faculty of Engineering, Doshisha University, as a Research Assistant from 1977 to 1979 and as an Associate Professor between 1986 and 1992. He has been a Professor with Doshisha University since 1992. His current research interests include pulsed power technology, such as development of a new plasma source for solid materials, pulsed ion technology, such as three-dimensional ion implantation technology, and exhaust gas processing in atmospheric pressure, such as decomposition of  $\text{NO}_x$ . He has research experience in exploding wire phenomena, excimer laser and vacuum ultraviolet emission technology, ion technology, and surface modification technology by plasmas at atmospheric pressure.

Dr. Yukimura was a Co-Chairperson of the Fifth International Workshop on Plasma-Based Ion Implantation (Kyoto, Japan, December 1999).