THE UNIVERSITY of EDINBURGH
School of Engineering

IMP seminar

11:00-12:00 on **16th June 2023** | **HBB_Classroom 4**

Innovation in Ultra-precision Machining through "Plasma nanoManufacturing Process"

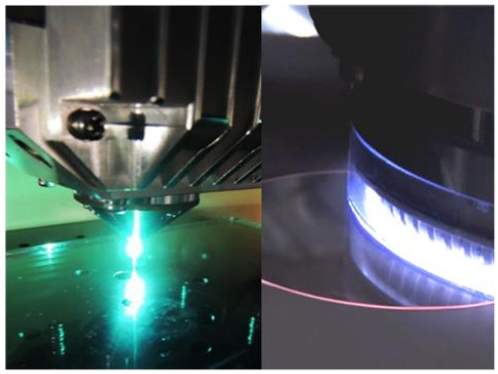
Prof Kazuya Yamamura

ABSTRACT

Wide gap semiconductor materials, such as SiC, GaN and diamond, are very promising materials for power device because of their excellent electronic and thermal properties. However, owing to the high hardness and chemical inertness of those materials, polishing rates of these materials are very low and subsurface damage is formed in conventional polishing process. To resolve these issues, we proposed nanomanufacturing process based on plasma.

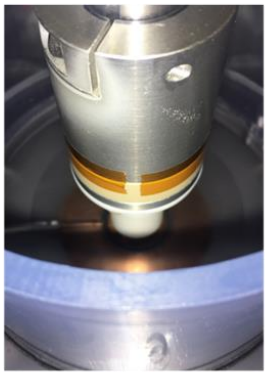
In this presentation, I introduce two kinds of nanomanufacturing processes developed by our laboratory. First is plasma chemical vaporization machining (PCVM) utilizing atmospheric pressure plasma etching for figuring of optical components with nanometer order form accuracy. Second is plasma-assisted polishing (PAP), which combines atmospheric-pressure plasma irradiation and soft abrasive dry polishing for finishing of wide gap semiconductor materials and fine ceramics.

Plasma Processes



- **Figuring of nano-Precision Optical Components.**
- **Finishing of Widegap Semiconductor Materials & Fine Ceramics Materials**

Electrochemical Processes



- **Finishing of SiC, GaN Wafer & WC Materials**

SPEAKER

Prof Kazuya Yamamura received the B.S., M.S., and Ph. D. degrees in engineering from Osaka University, Osaka, Japan, in 1989, 1991, and 2001, respectively. Since 2017, he has been a Professor at graduate school of engineering, Osaka University, Osaka, Japan.

Prof. Yamamura's research area is development of unconventional ultraprecision fabrication process and its application. Information of Yamamura Lab can be found: http://www-nms.prec.eng.osaka-u.ac.jp/en/