Abstract Submitted
for the GEC09 Meeting of
The American Physical Society

Application of pulsed plasma thruster to materials processing[1]
TAKASHI KIMURA, MASAYASU IIDA, AKINORI ODA, Nagoya Institute of Technology — An electrothermal pulsed plasma thruster with a discharge room in an insulator rod is used as the pulsed plasma for ablation of insulator (PPA), and the material of the insulator rod is polytetrafluoroethylene (PTFE). The PPA has an anode at the end of the room and a cathode of divergent nozzle at the exit of the room. Both the anode and the cathode are made of aluminum. The distance of 13 mm between the anode and the cathode is equal to the plasma length. The diameter of the insulator rod is 4 mm. The pulsed plasma is generated by the stored energy in the capacitor connected to the electrodes. Electrical and optical measurements of PPA are carried out. From the measured waveforms of the voltage applied between the electrodes and the current, the maximum of the instantaneous power is on the order of MW and the maximum of current is on the order of kA during a short time of 5-10μs. On the other hand, the optical emission intensities emitted from the excited carbon and fluorine atoms are predominant. This fact should indicate the possibilities of diamond-like-carbon coating or Si etching without a parent gas such as hydrocarbon gas and fluorocarbon gas.

[1]This work is partially supported by Grant-in-Aid from the Japan Society for the Promotion of Science.

Takashi Kimura
Nagoya Institute of Technology

Date submitted: 09 Jun 2009 Electronic form version 1.4