Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Breakdown phenomenon across micrometer-scale surface gap under positive impulse voltage HIROYUKI IWABUCHI, SHIGEYASU MATSUOKA, AKIKO KUMADA, KUNIHIKO HIDAKA, The University of Tokyo —
With the miniaturization of electronic devices, insulation width between electrodes have been accordingly reduced. Consequently, electrical breakdown phenomenon across micrometer-scale gap is of great practical interest for insulation designing of miniaturized devices. In this research, breakdown characteristics across micrometer-scale surface gap were observed under the application of positive impulse voltage. As a result, breakdown voltage under positive impulse voltage across surface gap was independent of gap width. The results indicate that initial electrons emitted from the surface of the insulator in the vicinity of anode. In order to investigate the breakdown process, particle-in-cell simulation based on monte-carlo method was also conducted. Considering electron emission from the surface of the insulator, electrons emitted from the insulator surface can collide to the neutral particles and positive ions are generated. Generated ions move into the insulator surface and the secondary electrons are emitted. Consequently, discharge path along the surface of the insulator is formed. The results show that electron emission from the surface of the insulator plays an important role in breakdown across micrometer-scale surface gap.

Hiroyuki Iwabuchi
The University of Tokyo

Date submitted: 17 Jun 2015 Electronic form version 1.4