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Performance of electrical vacuum breakdown under cryogenic temperatures

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The cryogenic high-voltage pulsed DC system in FREIA laboratory continues the test series of copper electrodes to establish peculiarities of BDs craters occurred at low temperature down to 4K.
The system uses parallel plate 40 mm diameter anode and 62 mm diameter cathode with a tens micrometers inter-electrode space. 1 μs high-voltage rectangular dc pulses with a repetition rate up to 1 kHz were used for the conditioning test at 30 K temperature. Microscopic post-mortem observation was performed for the tested samples.
We found the size ratios for anode and cathode breakdown features that link the results from several microscopic techniques. The difference between morphology of breakdown features on anode and cathode will be presented. We will also clarify the experimental conditions for specific star-like BD features.

Topic

Experiments and Diagnostics

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