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1P71 - Ablation and Breakdown Characteristics of High Current Gas Spark Switch with Different Profiles

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In the field of high voltage discharge device and pulse gas laser, electrode profiles, in the determination of the polar electric field, have a direct impact on the quality of the product. From the demand of practical engineering, for the high-current two-electrode self-breakdown repetitive spark switch, in this paper, we selected the ball electrode, flat bulb electrode, Chang and Bruce, four different types of electrodes which were made of 90WNiFe in the same geometry except its profile. Under ˜20kV average self-breakdown voltage, ˜40kA average peak current and dry air environment, these four pairs of electrodes are tested for 5000 shots short circuit discharge in standard atmospheric pressure, respectively. During the experiment, the distance between two electrodes were set to be 2,3,4,5,6 mm respectively and obtain the self-breakdown voltage curve to provide guidance for engineering practice. Self-breakdown voltage statistics and discharge stability are investigated. Furthermore, after the experiment, the high voltage electrodes were scanned by electron microscopy to observe the distribution of erosion area and ablation morphological characteristics of different electrodes.

Authors: Mr WANG, Yu; Prof. ZHANG, Yongmin; Prof. QIU, Aici; Mr LU, Yong; LIU, Qiaojue

Presenter: Mr WANG, Yu

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