



Characteristics of Sliding Discharge in a Multi-Rod Reactor

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Abstract:

This paper is aimed at investigating the characteristics of a sliding discharge (SD) including the onset voltage (VO), spark voltage (VS), and current-voltage (I-V) relationship in a multi-rod reactor stressed by sinusoidal AC or pulse voltage. The effects of various parameters (the voltage amplitude, frequency, gas flow rate, and voltage type) on the characteristics of the reactor sliding discharge (VO, VS and I-V relationship) have been studied experimentally. It has been found that the DC onset and spark voltages increase with the increase of the gas flow rate, while the effect of the frequency on them is not pronounced. The onset and spark voltages of the stressed reactor for sinusoidal AC voltage are lower than those obtained under a pulse voltage of the same peak value. Subsequently, the sliding current increases with the increase of the sinusoidal AC high voltage, the frequency, and the negative DC voltage, while, it decreases with the increase of the flow rate. It is observed that stressing the reactor with sinusoidal AC voltage gives higher values of sliding current than those obtained using a pulse at the same peak voltage. Stressing the reactor with sinusoidal AC voltage gives higher values of the NO removal efficiency than those obtained using pulse voltage.

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