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Post-breakdown secondary discharges at the electrode/dielectric interface of a cylindrical barrier discharge ROBERT CARMAN, BARRY WARD, DEBORAH KANE, Department of Physics and Astronomy, Macquarie University, Sydney, NSW, Australia — The electrical breakdown characteristics of a double-walled cylindrical dielectric barrier discharge (DBD) lamp with a neon buffer gas under pulsed voltage excitation have been investigated. Following the formation of plasma in the main discharge gap, we have observed secondary breakdown phenomena at the inner and outer mesh electrode/dielectric interfaces under specific operating conditions. Plasma formation at these interfaces is investigated by monitoring the Ozone production rate in controlled flows of ultra high purity oxygen together with the overall electrical voltage-charge characteristics of the lamp. The results show that this secondary breakdown only occurs after the main discharge plasma has been established, and that significant electrical power may be dissipated in generating these spurious secondary plasmas. The results are important with regards to optimising the design and identifying efficient operating regimes of DBD based devices that employ mesh-type or wire/strip electrodes.

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