

A Theory of RF Window Failure

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We have recently developed a novel theory of multipactor discharge on a dielectric. The main results include the susceptibility diagram [1] and the prediction that about one percent of the RF power is deposited to the dielectric surface over a wide range of conditions [2]. In this paper, we extend the analysis to include the effects of outgassing and the subsequent ionization by the multipactoring electrons. This is an attempt to understand the final stage of dielectric failure that is initiated by multipactor. Similarities and differences in such failures, under RF and DC conditions, are explored. Analytic theory and simulation results will be presented and compared with experiments.

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[1] Kishek and Lau, Phys. Rev. Lett. 80, 193 (1998).

[2] Ang et al., IEEE Trans. Plasma Sci. 26, 290 (1998).