عنوان مقاله:

Estimation of photo-degradation of dielectrics surrounding the narrow channel due to PD activity

محل انتشار:

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خلاصه مقاله:

Partial discharge (PD) taking place withinnarrow channels produces a large number of charged particles,causing degradation of the polymer. Additionally,PD pulses also produce UV photons due to decay ofexcited states (radiative states) in air. These may haveenough energy to break C–C bonds and thereby add to thedegradation of the dielectrics surrounding the narrowchannel. In this paper, a radiation transport (RT) model hasbeen developed and integrated with a Particle-in-Cell/Monte Carlo collision (PIC-MCC) model to study thebehavior of excited (radiative) states of air within dischargein the narrow channel. The radiative state atoms aredescribed by a fluid model combined with the Holstein–Biberman equation. This model has the ablation to followthe spatial evolution of the radiative excited-state densitythroughout narrow channel. The effect of applied electricfield, narrow channel dimensions, gas pressure on theextent of degradation of dielectrics surrounding the narrowchannel is studied.

کلمات کلیدی:

Spark-type partial discharge Dielectric degradation Radiation transport model PIC-MCC simulation