The Influence of Space Radiation on the Relative Permittivity of Dielectrics

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In the study of internal charging of dielectrics inside the spacecraft, we mainly focus on the influence of conductivity of dielectrics induced by space radiation (Radiation Induced Conductivity), and regard the relative permittivity as constant. However, during the ground testing of dielectrics, we found that the relative permittivity of dielectrics decreased after being exposed to electron beams, thus affecting the electric field and the release of charge inside dielectrics. The relative permittivity can gradually return to the initial state when the radiation stops. In the paper, we present the experiment result and try to give explanations on the mechanism behind this phenomenon.