

Study of MgTiO₃ and Alumina with a new non destructive space charge measurement method

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Non destructive methods for space charge measurements have interested many research teams for more than 25 years. The presence of space charges in a dielectric material is understood in terms of local defects and may induce fatal breakdowns under low DC voltage bias. This is why space charge measurements are used to value the electrical quality of dielectric materials such as polypropylene film for power capacitors. The present work deals with the use of the Alternating Thermal Wave Method (ATWM) for non destructive space charge measurements on dielectric ceramic as alumina and compositions based on pure and LiF doped MgTiO₃ developed for type I multilayer ceramic capacitors. We describe the protocol for experimental measurements performed on around 500 micrometers thick ceramic sheets and the signal processing associated with. We give numerical simulations in order to evaluate the resolving power of our technique on this material. Experimental results measured on pure and various doped MgTiO₃ and alumina samples are presented and discussed.