



Sonderforschungsbereich 595

Elektrische Ermüdung in Funktionswerkstoffen



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Interaction of dipole impurities and defects with domain structure in ordered and disordered ferroelectrics as a possible mechanism of their fatigue

There is an increasing interest in using ordered and disordered ferroelectrics (both single crystals and thin films) in many technical applications like nonvolatile computer memory elements, actuators, transducers etc. The main property of ferroelectric is that the direction of its spontaneous polarization can be altered (switched) by the application of external electric field. This process involves the domain structure of a ferroelectric. Disordered materials give one more possibility to control their physical properties, namely the variation of concentration and type of the defects and/or impurities. On the other hand the defects, interacting with each other and the domain structure of a host material can deteriorate the performance of above devices because of so-called material fatigue. We present the theoretical formalism for the description of such interaction in ordered and disordered ferroelectrics. Our analysis shows that the interaction of dipole impurities with domain structure in disordered ferroelectrics generate logarithmic time dependence of the dielectric constant during aging. The results of our theory are favorably compared with experiments.

Die Vorträge finden, wenn nicht anders angegeben, jeweils um **16:15**
im Gebäude der Materialwissenschaften, Lichtwiese, Petersenstr. 23, **Raum 77** statt