



Sonderforschungsbereich 595

Elektrische Ermüdung in Funktionswerkstoffen



TECHNISCHE
UNIVERSITÄT
DARMSTADT

Kolloquium SOMMERSEMESTER 2008

08.05.
2008

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Structure, stability and mobility of charged ferroelectric domain walls

Charged domain walls can be present in various ferroelectric systems. It is known that ferroelectric domain walls bear bound polarization charge as soon as the normal component of the polarization is not continuous across it. The additional electrostatic energy associated with this charge makes the configurations containing such walls energetically less favorable and, under certain conditions, make a charged wall absolutely unstable. However, in practice, the appearance of charged domain walls is often inevitable. This always happens at the reverse domain nucleation during ferroelectric switching. Another situation where charged domain walls are likely to appear takes place when a ferroelectric is poled along a direction which is different from all possible directions of the spontaneous polarization in the crystal. Of practical interest is the case of "oblique" poling of the so-called morphotropic-boundary materials. An important feature of these systems is the possibility of full or partial screening of the bound charge on the wall with free electronic charge available in the material.

The present paper theoretically addresses the stability and mobility of charged domain walls, which essentially control the switching and poling phenomena in these systems. The focus of the paper is on the effects associated with the screening of the bound charge on the wall with free charges and the effects associated with the vicinity of the material to a morphotropic boundary.

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