



Sonderforschungsbereich 595 Elektrische Ermüdung in Funktionswerkstoffen



TECHNISCHE
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DARMSTADT

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Insights into the Nature and Dynamics of Point Defects in Ferroelectric Materials.

In any material, the defects can strongly perturb the properties, either electrical or mechanical. Point defects in ferroelectric materials are very important and often control performance and device limitations of capacitors and piezoelectrics. As we look forward into the future, the applications pulls on ferroelectric and dielectric material will demand higher electric fields and higher temperatures. Here we will discuss new insights into oxygen vacancy behavior in perovskite-based dielectrics. First, we will consider the defects that are established under equilibrium conditions that can be quenched in and are determined by partial Schottky reactions. Second, we will consider defect complexes that are resulting from acceptor and acceptor-donor pairs in the formulation. Third, we will consider the degradation process in multilayer ceramic capacitors and a new equation that predicts meantime to fail. Finally, we consider ferroelectric materials with very high oxygen vacancy concentrations and consider ferroelectrics under the universality of the Mott Criterion, and the possible new applications such as thermoelectrics.

References:

1. Lee et al., J. Am. Ceram. Soc. 91, 1748-1752 (2008).
2. Lee et al., J. Appl. Phys. 105, 093519 (2009).
3. W. Liu and C.A. Randall, J. Am. Ceram. Soc. 91, 3245 (2008).
4. C.A. Randall et al., accepted by J. Appl. Phys. (2012).
5. Lee et al., J. Euro. Ceram. Soc. 32, 3971 (2012).

Der Vortrag findet um **11:00 Uhr** im Gebäude der Materialwissenschaften,
Lichtwiese, Alarich-Weiss-Str. 2, **Raum 77** statt