SFB 595 Deutsche Forschungsgemeinschaft DFG

Sonderforschungsbereich 595

Elektrische Ermüdung in Funktionswerkstoffen

TECHNISCHE UNIVERSITÄT DARMSTADT

Sonderkolloquium im SOMMERSEMESTER 2011

18.05. 2011

Prof. David Cann

Materials Science, Oregon State University

THE UNUSUAL BEHAVIOR OF $BI(ZN_{1/2}TI_{1/2})O_3$ IN PEROVSKITE SOLID SOLUTIONS

The presentation will summarize recent results on the crystal structure, dielectric properties, and piezoelectric properties of perovskite solid solutions with $Bi(Zn_{1/2}Ti_{1/2})O_3$ (BZT) as a component. With a tolerance factor of t = 0.95, BZT is not stable under normal atmospheres and pressures. However, recent work has shown that BZT can form solid solutions with a large number of stable perovskites such as PbTiO3, BaTiO3, NaNbO3, and (Bi,Na)TiO3. The addition of the $Bi(Zn_{1/2}Ti_{1/2})O_3$ phase has a profound impact on the phase transition in a normal ferroelectric such as $BaTiO_3$ or an antiferroelectric such as $NaNbO_3$. These systems exhibit a diffuse phase transition and a slim quasi-linear dielectric response with no measurable remanent polarization, which may be an indication of weakly-coupled relaxor behavior. This presentation will highlight recent findings on the influence of the microstructure and engineered point defects (i.e. non-stoichiometry and doping) on the dielectric response. In particular, we will show that cation deficient compositions exhibit an increase in relative permittivity, an increase in the insulation resistance, and a reduction in dielectric loss. It will also be shown that many BZT-based solid solutions also exhibit an unusual electromechanical strain behavior that is characterized by large hysteretic strains under E-fields above 50 kV/cm.

Die Vortrag finden um **15:00 Uhr** im Gebäude der Materialwissenschaften, Lichtwiese, Petersenstr. 23, **Raum 77,** statt.