

Scaling equation of state for uniaxial ferroelectrics: zero-field susceptibility and *NDE* effect.

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The simplest scaling equation of state and its limit case corresponding to the Landau theory turns out to accurately describe the temperature dependence of the electric susceptibility measured in a biasing static field (Nonlinear Dielectric Effect *NDE*) in uniaxial ferroelectrics. The same equation of state should be, in principle, valid at the zero-biasing field, in which case the susceptibility is singular, where Γ_+ and Γ_- are the inverse Curie–Weiss constants at $T > T_C$ and $T < T_C$, respectively. The simplest scaling equation of state implies the ratio $\Gamma_-/\Gamma_+ = \delta - 1$, where δ is a critical exponent: $\delta = 3$ in the Landau theory. However, the real experimental data show serious discrepancies with this prediction even in systems following the Landau theory. We show how to improve the equation of state without infringing the scaling hypothesis so that this discrepancy is removed. An interesting result of the proposed modification is that the deviation of Γ_-/Γ_+ from $\delta - 1$ is a signature of the critical exponent γ being different from 1. The experimental data on the uniaxial ferroelectrics MAPCB and MAPBB will be used as examples of the treatment.

Słowa kluczowe

Curie–Weiss constants ratio, Scaling equation of state, Scaled susceptibility curves, Ferroelectric materials

Adres publiczny

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