

Drude-Nernst equation (for electrostriction)

Equation describing the contraction (ΔV_{el}) taking place in a dielectric medium of relative static permittivity ϵ_r (formerly called dielectric constant) upon introduction of an ion of charge number z and radius r :

$$\Delta V_{\text{el}} = -\frac{(ze)^2}{2r\epsilon_r} \frac{\partial(\ln\epsilon_r)}{\partial p}$$

with e the elementary charge.

Note: Inasmuch as the derivative of $\ln\epsilon_r$ with respect to pressure, $\partial \ln\epsilon_r / \partial p$, is not known for all media, there are approximations to evaluate this term as a function of ϵ_r and of the isothermal compressibility of the medium, κ_T .

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