

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 :

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

with e the elementary charge.

Note:

Inasmuch as the derivative of $\ln \epsilon_r$ with respect to pressure, $\frac{\partial(\ln \epsilon_r)}{\partial p}$, 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 .

Source:

PAC, 2007, 79, 293 (*Glossary of terms used in photochemistry, 3rd edition (IUPAC Recommendations 2006)*) on page 327