

Lorentz-Model

1. Consider a model for a simple ionic insulator which consists of a single Lorentz oscillator with resonance frequency $\omega_o = 200 \text{ cm}^{-1}$, scattering rate $\Gamma = 3 \text{ cm}^{-1}$ and oscillator strength $\omega_p = 1000 \text{ cm}^{-1}$.
 - (a) Calculate, for $0 \leq \omega \leq 1000 \text{ cm}^{-1}$, the real and imaginary parts of the dielectric function and show both curves on the same plot.
 - (b) Calculate, for $0 \leq \omega \leq 1000 \text{ cm}^{-1}$, the real and imaginary parts of the index of refraction and show both curves on the same plot
 - (c) Plot the normal incidence reflectance or $0 \leq \omega \leq 1000 \text{ cm}^{-1}$.
 - (d) Explore the effect of changing the parameters (one at a time of course) by plotting new graphs. Describe the effect of each parameter on the shape of ϵ_1 , ϵ_2 and R .