$\gamma_{\rm mol} = \dfrac{1}{N} \cdot \dfrac{\epsilon_r - 1}{\epsilon_r + 2}$, $\epsilon_r = -\dfrac{2N\gamma_{\rm mol} + 1}{N\gamma_{\rm mol} - 1}$.

Treat $\gamma_{\rm mol}$ as constant,

$$\begin{aligned}\frac{\partial \epsilon_r}{\partial N} &= -\frac{2\gamma_{\rm mol}(N\gamma_{\rm mol} - 1) - (2N\gamma_{\rm mol} + 1)\gamma_{\rm mol}}{(N\gamma_{\rm mol} - 1)^2} = \frac{3\gamma_{\rm mol}}{(N\gamma_{\rm mol} - 1)^2} \\ &= \frac{3\dfrac{1}{N} \cdot \dfrac{\epsilon_r - 1}{\epsilon_r + 2}}{\left(\dfrac{\epsilon_r - 1}{\epsilon_r + 2} - 1\right)^2} = \frac{(\epsilon_r - 1)(\epsilon_r + 2)}{3N}.\end{aligned}$$