

Answer on Question #79413- Chemistry - Physical Chemistry

Question:

Calculate the relative populations of a spherical rotor in the levels with $J = 0$ and $J = 5$, given that $\tilde{\nu} = 2.71 \text{ cm}^{-1}$ and a temperature of 298 K.

Solution:

The relative populations of a spherical rotor = $N_J/N_0 = (2J+1)\exp(-E_J/kT) = 11 \cdot \exp(-2.71/(1.381 \cdot 10^{-23} \cdot 298)) = 1.48 \cdot 10^{-18}$.