Answer on Question #76784 - Chemistry - Inorganic Chemistry

Question:

determine the wavelengh for a transition from the v=0 to the v=1 level .is this tranistion in the ir region of the electromagnetic spectrum?

Solution:

The photon energy in the transition from the level v = 0 to v = 1 is:

$E_{ph} = \Delta E = E_1 - E_0 = 3/2hv_0 - \frac{1}{2}hv_0 = hv_0$;

Since the energy of a photon is given by $E_{photon} = hv$, the frequency of the transition from the first to the next second vibrational level is:

$E_{ph} = hv$;

$\lambda = c/v_0 = 3*10^8/8.963*10^{13} = 3.345 * 10^{-6}$ m = 3345 nm.

Answer: 3345 nm.