



$\Delta E = \hbar\omega$ does not change as the levels are equally spaced.

$v=0 \Rightarrow E_{vib} = \frac{1}{2}\hbar\omega$ is called the zero-point energy.

In general, an excited molecule will rotate AND vibrate at the same time

$$\Rightarrow E_{rot-vib} = \frac{\hbar^2}{2I_{cm}} l(l+1) + (v + \frac{1}{2})\hbar\omega$$

The rotational-vibrational energy levels are as follows:

