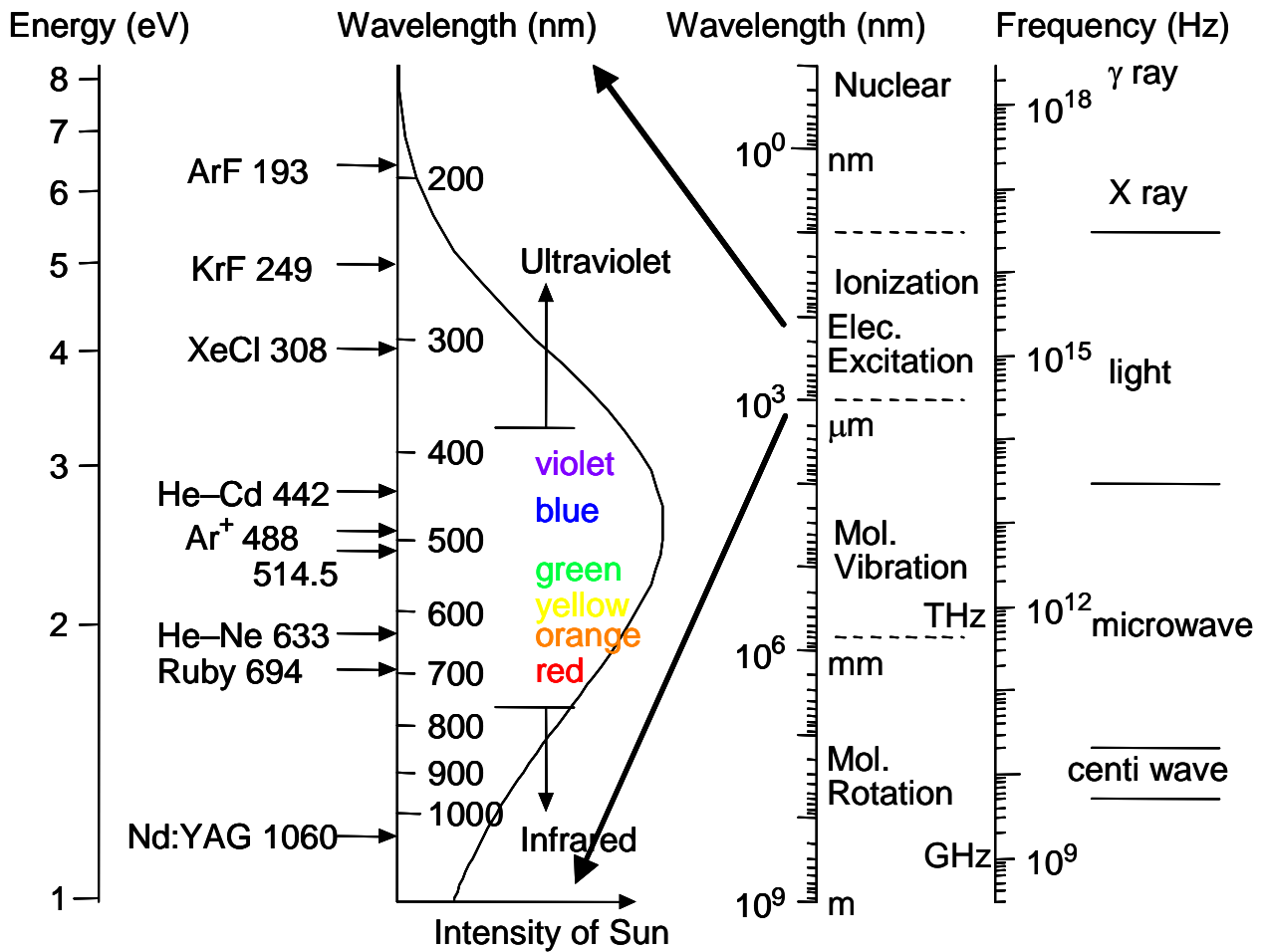


# Wavelength of light and Energy



CO<sub>2</sub> 10600

$$\text{Energy } E = h\nu \text{ or } \hbar\omega = \left(\frac{h}{2\pi}\right)(2\pi\nu)$$

$\nu$ : Frequency

$$\text{Wavelength } \lambda = \frac{c}{\nu} \quad \text{Wave number } \tilde{\nu} = \frac{\nu}{c} = \frac{1}{\lambda}$$

Plank Constant  $h = 6.62618 \times 10^{-34}$  Js

Speed of light  $c = 2.997925 \times 10^8$  m/s

Electron volt  $1 \text{ eV} = 1.60219 \times 10^{-19}$  J

Boltzmann Constant  $k_B = 1.38066 \times 10^{-23}$  J/K

$$E_{eV} = \frac{1240}{\lambda_{nm}} = 1.240 \times 10^{-4} \tilde{\nu}_{cm^{-1}} \quad \tilde{\nu}_{cm^{-1}} = \frac{10^7}{\lambda_{nm}} \quad \nu_{Hz} = \frac{3 \times 10^{17}}{\lambda_{nm}} \quad T_K = 1.16 \times 10^4 E_{eV}$$

1 a.u. = 0.5291771 Å (Bohr radius  $a_0 = \hbar^2 / me^2$ ), 1 a.u. (Hartree) = 27.21161 eV