$\bar{\nu} \leftrightarrow k$ units conversion

Let us find k in $\frac{H}{\mathring{A}^2}$ ~~form~~ from $\bar{\nu} = 4000\ cm^{-1}$

and $\mu = \frac{1}{2}$ a.m.u

$$\nu = c\bar{\nu} = \frac{1}{2\pi}\sqrt{\frac{k}{\mu}}$$

$$\therefore k = 4\pi^2 c^2 \bar{\nu}^2 \mu$$

$$= 4 \times (3.14)^2 \times \left(3\times10^{8}\ ms^{-1}\right)^2 \times \left(4000\times10^{2}\ m^{-1}\right)^2 \times \left(0.5 \times 1.66\times10^{-27}\ kg\right)$$

$$= 471.37\ J m^{-2}$$

$$= \frac{471.37 \times 10^{-3}\ kJ}{(1\times10^{+10})^2\ \mathring{A}^2} \times \frac{6.023\times10^{23}\ mol^{-1}}{2625.87\ kJ\ mol^{-1}}$$

$$= \frac{1.08\ a.u\ of\ energy\ (Hartree)}{\mathring{A}^2}$$

$$= 1.08\ H\ \mathring{A}^{-2}$$