

6. With  $V = 1.0 \times 10^{-6} \text{ m}^3$ ,  $p = 1.01 \times 10^{-13} \text{ Pa}$ , and  $T = 293 \text{ K}$ , the ideal gas law gives

$$n = \frac{pV}{RT} = \frac{(1.01 \times 10^{-13}) (1.0 \times 10^{-6})}{(8.31)(293)} = 4.1 \times 10^{-23} \text{ mole} .$$

Consequently, Eq. 20-2 yields  $N = nN_A = 25$  molecules. We can express this as a ratio (with  $V$  now written as  $1 \text{ cm}^3$ )  $N/V = 25 \text{ molecules/cm}^3$ .