

83. The average kinetic energy is related to the absolute temperature by

$$\begin{aligned}K_{\text{avg}} &= \frac{3}{2}kT \\4.0 \times 10^{-19} \text{ J} &= \frac{3}{2} (1.38 \times 10^{-23} \text{ J/K}) T\end{aligned}$$

which yields  $T = 19.3 \times 10^3 \text{ K}$ .