Exercise 10-4

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$$\left(\frac{\partial S}{\partial T}\right)_V = \frac{C_V}{T}$$

← Yknow, not nice

$$dS = \int_0^T \frac{C_V}{T}\,dT = \int_0^T \frac{12}{5}\pi^4 R\,\frac{T^2}{\Theta_D^3}\,dT$$

$$= \frac{1}{3}\cdot\frac{12}{5}\pi^4 R\,\frac{T^3}{\Theta_D^3}$$

$$= \frac{4}{5}\pi^4 R\,\frac{T^3}{\Theta_D^3}$$

$$= \begin{cases} 2{,}40\cdot 10^{-8}\ \mathrm{J\,mol^{-1}K^{-1}} & \text{if } T = 0.01\,\mathrm{K} \\ 24{,}0\ \mathrm{J\,mol^{-1}K^{-1}} & \text{if } T = 10\,\mathrm{K} \end{cases}$$

$$= \begin{cases} 2{,}40\cdot 10^{-11}\ \mathrm{J\,mol^{-1}K^{-1}} & \text{if } T = 0.01\,\mathrm{K} \\ 2{,}40\cdot 10^{-2}\ \mathrm{J\,mol^{-1}K^{-1}} & \text{if } T = 10\,\mathrm{K} \end{cases}$$