Now, equating this value to the expression for D given in the problem gives

$$D = 1.31 \text{ x } 10^{-18} \text{ m}^2/\text{s} = \left(2.4 \text{ x } 10^{-4}\right) \exp\left[-\frac{347{,}000 \text{ J/mol}}{(8.31 \text{ J/mol - K})(T)}\right]$$

To solve for T, let us take the natural logarithms of both sides of the above equation; this leads to

$$\ln\left(1.31 \text{ x } 10^{-18}\right) = \ln\left(2.4 \text{ x } 10^{-4}\right) - \frac{347{,}000}{8.31T}$$

$$-41.176 = -8.335 - \frac{4.176 \text{ x } 10^4}{T}$$

which yields a value for T of 1271 K (998°C).