Problem 11-2

Elementary reaction:

$$A \leftrightharpoons B$$

$X_e = 0.8$ at $T = 127°C$

$X_e = 0.5$ at $T = 227°C$

What is $\Delta H°$?

$$T_1 = 400K$$

$$T_2 = 500K$$

Van't Hoff equation:

$$\frac{d}{dT} \ln K_{eq} = \frac{\Delta H°}{RT^2}$$

$$K_{eq} = \exp\left(\frac{3\Delta H° T^3}{R}\right)$$

$$\frac{0.8}{0.5} = \exp\left(\frac{3\Delta H°(400^3 - 500^3)}{R}\right)$$

$$\Delta H° = \frac{\frac{R}{3}\ln\left(\frac{0.8}{0.5}\right)}{400^3 - 500^3}$$

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ΔH° = -5.103263449788398e-9
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- `ΔH° = 1.987 * log(0.8 / 0.5) / 3 / (400^3 - 500^3)`

The enthalpy is -5.1e-9 cal/mol