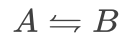


## Problem 11-2

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Elementary reaction:



$$X_e = 0.8 \text{ at } T = 127^\circ\text{C}$$

$$X_e = 0.5 \text{ at } T = 227^\circ\text{C}$$

What is  $\Delta H^\circ$ ?

$$T_1 = 400\text{K}$$

$$T_2 = 500\text{K}$$

Van't Hoff equation:

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

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

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

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

$$\Delta H^\circ = -5.103263449788398\text{e-}9$$

$$\bullet \Delta H^\circ = 1.987 * \log(0.8 / 0.5) / 3 / (400^3 - 500^3)$$

The enthalpy is -5.1e-9 cal/mol

