

Answer on Question #79419, Chemistry/General Chemistry

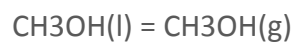
The vapor pressure of methanol (CH₃OH) at 25°C is 126 mmHg.

$$K_p = 0.166$$

Calculate the value of ΔG°

Solution

The equilibrium that takes place is:



At equilibrium $\Delta G = 0$

$$G_{\text{gas}} - G_{\text{liq}} = 0$$

$$[G_{\text{gas}}^\circ + RT \ln(p/p_o)] - G_{\text{liq}} = 0$$

$$G_{\text{gas}}^\circ - G_{\text{liq}} = -RT \ln(p/p_o)$$

$$\Delta G^\circ = -RT \ln(p/p_o)$$

$$\Delta G^\circ = -8.314 \text{ J/mol K} \times 298 \text{ K} \times \ln(126 \text{ mmHg}/760 \text{ mmHg}) = 4452 \text{ J/mol}$$

Answer: 4452 J/mol