第二章习题

1. (1) × (2) × (3) × (4) × (5) × (6) ✓ (7) ✓

(8) ✓

2. (1) b (2) b (3) b (4) c (5) d (6) C.

7. $\Delta_r G_m(273.15K) = \Delta_r G_m^\theta(273.15) + RT$

$= -236.7 + 8.314 \times 273.75 > 0$

∴不自发。

10. $n = \frac{m}{M} = \frac{3.8}{342} \approx 1.1 \times 10^{-2}$ mol

$\Delta_r H_m^\theta(298.15K) = [11 \times (-285.83) - 12 \times 393.509 + 2225.5]$ kJ/mol

$= -5640.7$ kJ/mol

$\Delta S_m^\theta(298.15K) = 11 \times 69.91 + 12 \times 213.74 - 12 \times 205.138 - 360.2$ J/mol

$= 512.0$ J/(mol·K)

∴ $\Delta G_m^\theta = \Delta H_m^\theta - T\Delta S_m^\theta = -5799.5$ kJ/mol

∴ $\Delta G_{m功} = -5799.5 \times 1.1 \times 10^{-2}$ kJ $= -64.4$ kJ

∴ $W = |\Delta G_{m功}| \times 30\% = 19.3$ kJ

15. 由 $\ln \frac{K_1^\theta}{K_2^\theta} = \frac{\Delta_r H_m^\theta}{R}\left(\frac{T_2 - T_1}{T_1 T_2}\right) = -22.5$

∴ $K_2^\theta = 1.4 \times 10^{10}$

18. (1) $v_1 = k c_1(Cl_2) \cdot c_2^2(NO)$

(2) 级数：1+2=3

(3) $v' = 0.5k \cdot c(Cl_2) \cdot 0.5^2 \cdot c^2(NO) = \frac{1}{8} \cdot k c(Cl_2) \cdot c^2(NO)$

∴是原来的 $\frac{1}{8}$

(4) $v'' = k c(Cl_2) \cdot 4 c^2(NO) = 9v$ ∴是原来的九倍.

19. $t = \frac{1}{k} \ln \frac{c_1}{c_0} \approx 3.52 \times 10^4\ h$

21. $\ln \frac{v_1}{v_2} = \ln \frac{t_2}{t_1} = \ln \frac{k_1}{k_2} = \frac{E_a(T_1 - T_2)}{R T_1 T_2}$

$\ln \frac{500}{1515} = \frac{Ea}{8.314} \times \left(\frac{290-300}{290 \times 300}\right) = -1.11$

∴ $E_a = 8.02 \times 10^4\ J/mol = 80.2\ kJ/mol$