

CHEM1612 (Chemistry Pharmacy 1B) - November 2006

2006-N-2

- $-333.6 \text{ kJ mol}^{-1}$
 $-82.4 \text{ J K}^{-1} \text{ mol}^{-1}$

ΔS° is negative as going from less ordered to more ordered state (3 mol gas to 1 mol gas).

2006-N-3

- copper
- As the halogen gets bigger, the length of the H-X bond increases and hence gets weaker. The weaker the bond, the more easily the H^+ dissociates.

As the electronegativity of the halide increases, the more electron density it pulls from the O-H bond towards itself. This results in the O-H bond becoming more polar and increasing the ease with which the H^+ will be lost.

2006-N-4

- 8.10
4.12

2006-N-5

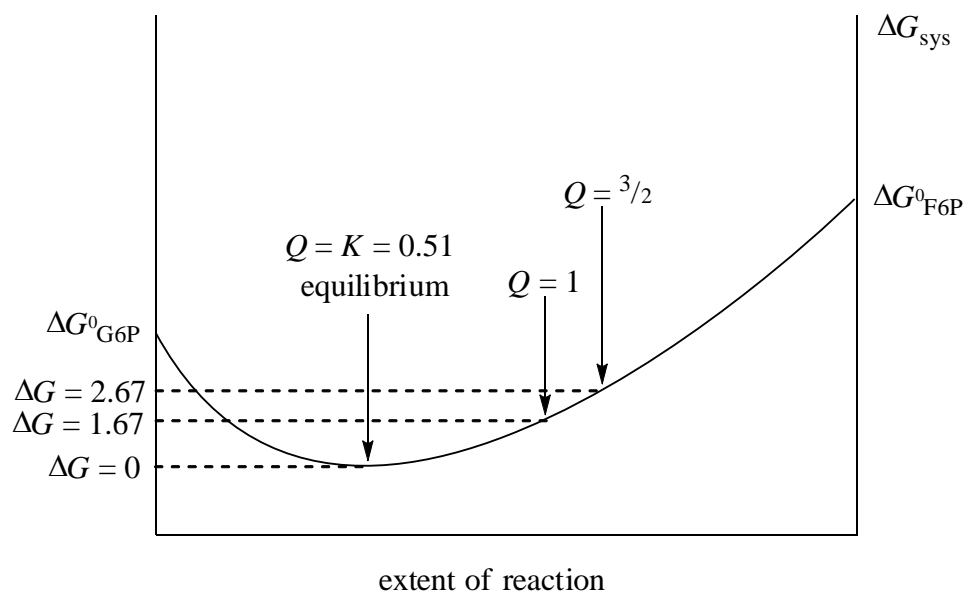
- -262 kJ mol^{-1}

2006-N-6

0.12 M
[$\text{CO}_2(\text{g})$] decreases

2006-N-7

- 0.510
 2.67 kJ mol^{-1}

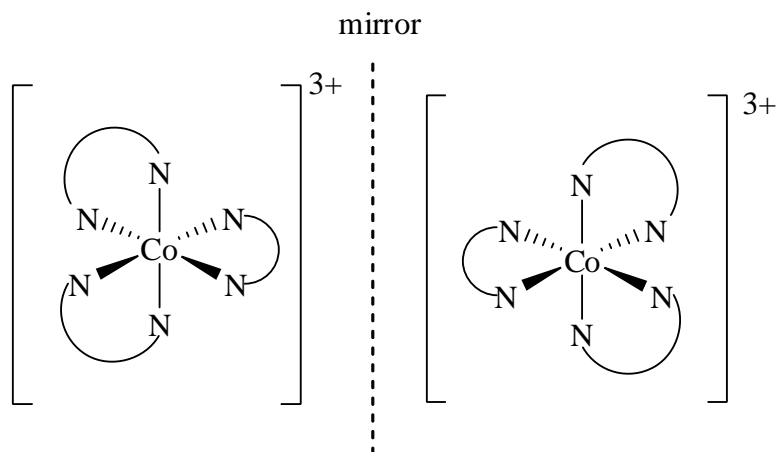


2006-N-8

- $-2.11\text{ }^{\circ}\text{C}$
 23.28 mmHg
 $2.80 \times 10^6\text{ M}$

2006-N-9

- $7.0 \times 10^{-8}\text{ M}^3$



- tetraaquadibromocobalt(III) chloride
 potassium dicyanoaurate(I)

2006-N-10

- $\text{Cd}^{2+} + 4\text{NH}_3 \rightleftharpoons [\text{Cd}(\text{NH}_3)_4]^{2+}$

$$K_{\text{stab}} = \frac{[\text{Cd}(\text{NH}_3)_4]^{2+}}{[\text{Cd}^{2+}][\text{NH}_3]^4}$$

- 0.40 V

2006-N-11

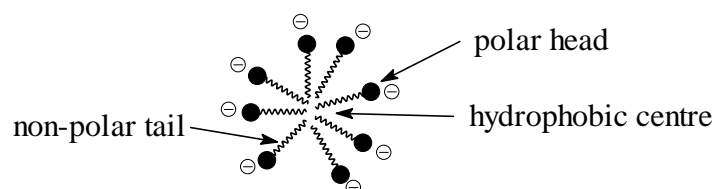
- -100 kJ mol^{-1}
 3.9×10^{17}
 $\text{Zn(s)} \mid \text{Zn}^{2+}(\text{aq}) \parallel \text{Ni}^{2+}(\text{aq}) \mid \text{Ni(s)}$
- 2.29 minutes

2006-N-12

- 41 mg
- They can be stabilised via electrostatic and steric stabilisation.

Hydrophilic colloids may have a charge on their surface that attracts oppositely charged ions (H^+ or OH^- present in water) to form a tightly bound layer known as the Stern Layer. The Stern layer is surrounded by a diffuse layer which contains an excess of counter-ions (opposite in charge to the Stern layer) and a deficit of co-ions. The Stern layer and diffuse layer are collectively known as a double layer. Coagulation of a hydrophilic colloid is prevented by mutual repulsion of the double layers.

Hydrophobic colloids may be stabilised by the use of a surfactant, *e.g.* a long chain fatty acid with a polar head and a non-polar tail. When dispersed in water these molecules arrange themselves spherically so that the polar (hydrophilic) heads are interacting with the polar water molecules and the non-polar (hydrophobic) tails are interacting with each other. This arrangement is called a micelle. The hydrophobic colloid can be stabilized by dissolving in the non-polar interior of the micelle.



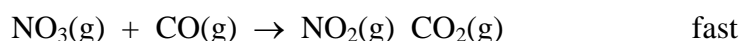
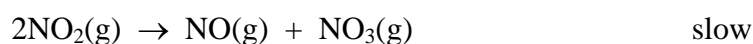
- $2.23 \times 10^3 \text{ kJ mol}^{-1}$

2006-N-13

- $\text{Rate} = k[\text{NO}_2]^2$

$$k = 2.08 \times 10^{-4} \text{ L mol}^{-1} \text{ s}^{-1}$$

$$5.21 \times 10^{-5} \text{ M s}^{-1}$$



The slow first step is consistent with rate law of $\text{Rate} = k[\text{NO}_2]^2$. The fast second step is consistent with the rate being independent of $[\text{CO}]$.