CHEM1909 (1LS Advanced Course) - November 2003

2003-N-2

- $\Delta H° = -203.0$ kJ mol^{-1}

  78.3 J

  +74.9 K

2003-N-3

- 1.11×10^{-10}

  191 kJ mol^{-1}

  non-spontaneously

  to the left (reactants)

2003-N-4

- 0.080 M

  1.96 atm

  77.2 kJ mol^{-1}

  [NOCl] decreases

  to the left (reactant) side

2003-N-5

- 7.65×10^{4} g mol^{-1}

  1.22 K kg mol^{-1}

2003-N-6

- 132 g

  2×10^{-21} M

2003-N-7

- –58.2 kJ mol^{-1}

  0.030

  1.40

2003-N-8

- $H_2PO_4^-(aq) + OH^-(aq) \rightleftharpoons HPO_4^{2-}(aq) + H_2O(l)$

  $HPO_4^{2-}(aq) + H^+(aq) \rightleftharpoons H_2PO_4^-(aq)$

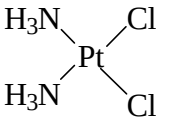
  7.20 where $[HPO_4^{2-}(aq)] = [H_2PO_4^-(aq)]$

  0.71

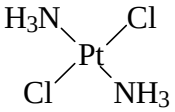
2003-N-8 (cont)

- Structural (or coordination) isomers - different ligands in the complex
  eg $[Cr(H_2O)_3Cl_3]\cdot 3H_2O$ triaquatrichlorochromium(III)-3-water
  eg $[Cr(H_2O)_4Cl_2]Cl\cdot 2H_2O$ tetraaquadichlorochromium(III) chloride-2-water

  Geometrical isomers - different arrangement of ligands

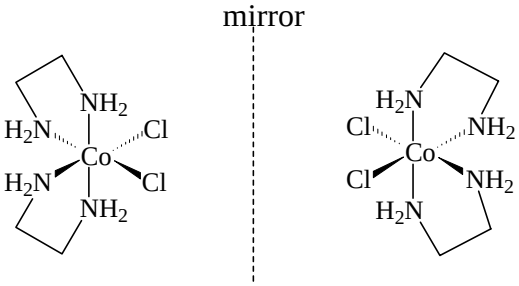


cis-diamminedichloroplatinum(II)



trans-diamminedichloroplatinum(II)

  Optical isomers - non-superimposable mirror images



bisethylenediaminedichlorocobalt(II)

2003-N-9

blood	red blood cells	water/plasma
milk	casein	water
cell	nucleus, ribosomes, etc	cell fluid/ctyoplasm

- Electrostatic stabiliser. The hydrophobic part of the molecule is adsorbed onto the surface of the fat whilst the hydrophilic carboxylate group is in contact with the surrounding water. The solublised fat is stabilised in the water by the double layer of repulsion charges that prevents coagulation.

2003-N-10

- 1.2×10^{-3} M s^{-1} 0.7×10^{-3} M s^{-1}

  $n = 1$

  $k = 1.2$ M^{-2} s^{-1}

  Fast equilibrium gives $K = [HI]/[H^+][I^-]$ $\Rightarrow$ $[HI] = K[H^+][I^-]$

  Rate = $k[HI][H_2O_2]$ {The slow step is rate determining}

  $= kK[H^+][I^-][H_2O_2]$

  $= k_1[H^+][I^-][H_2O_2]$ {consistent with given rate equation}

2003-N-11

- 2.7 μCi