June 2002 CHEM1611 Chemistry 1 (Pharmacy) Course

2002-J-2

- $Ba^{2+}(aq) + SO_4^{2-}(aq) \rightarrow BaSO_4(s)$

  $CuO(s) + 2H^+(aq) \rightarrow Cu^{2+}(aq) + H_2O$

  $Hg_2^{2+}(aq) + 2Cl^-(aq) \rightarrow Hg_2Cl_2(s)$

  $MgCO_3(s) + 2H^+(aq) \rightarrow Mg^{2+}(aq) + CO_2(g) + H_2O$

  $Al^{3+}(aq) + 4OH^-(aq) \rightarrow [Al(OH)_4]^-(aq)$

  $Na(s) + H_2O \rightarrow Na^+(aq) + OH^-(aq) + \frac{1}{2}H_2(g)$

  $2Mg(s) + O_2(g) \rightarrow 2MgO(s)$

  $Cl_2(g) + 2Fe^{2+}(aq) \rightarrow 2Cl^-(aq) + 2Fe^{3+}(aq)$

  $FeS(s) + 2H^+(aq) \rightarrow Fe^{2+}(aq) + H_2S(g)$

  $3Co^{2+}(aq) + 2PO_4^{3-}(aq) \rightarrow Co_3(PO_4)_2(s)$

2002-J-3

- soluble soluble

  insoluble soluble

  insoluble insoluble

- $Co(NO_3)_2{\cdot}6H_2O$ ammonium thiocyanate

  perchloric acid KNO_2

  bismuth(III) nitrate $KHCO_3$

  arsenic $[Co(OH_2)_4Br_2]Cl$

  pentaaquachloronickel(II) nitrate $Hg_2(CH_3CO_2)_2$

  cis-diamminedichloroplatinum(II) $K_4[Fe(CN)_6]$

  phosphoric acid Al_2O_3

2002-J-4

- NSF_3O_3

  150 g mol^{-1}

  NSF_3O_3

- 5.45×10^4 J

- (i) pure water: water will enter the cells at a faster rate than it leaves. Cells will expand and burst - haemolysis
  (ii) 1 M NaCl: water will leave the cells at a faster rate than it enters. Cells will shrink and die - crenation.

2002-J-5

- (i) 9.4×10^{-4} M

  (ii) 3.0×10^{-2} mg mL^{-1}

- 1.60

- 9.24

2002-J-6

- 7.1×10^{-8} M^3

- $K_p = 4.1 \times 10^5$ $\Delta S = -201$ J K^{-1} mol^{-1}

2002-J-7

- 777
- Water has much stronger intermolecular forces (H-bonds) than liquid nitrogen (dispersion forces). More energy is therefore needed to break the intermolecular forces in water (in order to vaporise it) and hence it has the larger molar heat of vaporisation.
- $K_a = 5.4 \times 10^{-5}$ M

2002-J-8

- 9.12 L
- 0.092 mg
- 0.53 M

2002-J-9

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Ca	Formation of bones	Calcium phosphate is insoluble.
K	Maintains electrical neutrality of cell	Can be transported across cell membrane by carrier proteins.
Fe	Oxygen transport in cells	Transition metal with two oxidation states, Fe^{2+} and Fe^{3+}.
Cl	Maintain ionic balance between cell and its surroundings	Small, ionic (negatively charged) and can diffuse easily through the lipid bilayer.

- $Ag \rightarrow Ag^+ + e^-$ $\times 6$

  $Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$ $\times 1$

$$6Ag + Cr_2O_7^{2-} + 14H^+ \rightarrow 6Ag^+ + 2Cr^{3+} + 7H_2O$$