**Solubility of solids in solutions with a common ion**

**2018**

(i)Write the solubility product expression, *K*s, for silver chloride, AgCl.

(ii) Why does the solubility of AgCl decrease when a small volume of silver nitrate, AgNO3, solution is

added to a saturated solution of AgCl? Explain your answer.

(iii) Show by calculation whether a precipitate of AgCl will form when 70.0 mL of 0.0220 mol L–1 AgNO3 is

added to 50.0 mL of 0.0550 mol L–1 sodium chloride, NaCl.

*K*s(AgCl) = 1.80 × 10–10

**2017**

40.0 mL of 0.150 mol L–1 HBr solution was added to 25.0 mL of a saturated silver bromide, AgBr, solution.

(i) Write an equation for the equilibrium occurring in a saturated solution of AgBr.

(ii) Explain the changes that occur to the concentrations of the species in the saturated solution of AgBr on the addition of the HBr solution.

(iii) Calculate the concentration of the silver ions, Ag+, after the HBr solution has been added.

*K*s(AgBr) = 5.00 × 10–13

Assume the concentration of Br– in the original saturated solution of AgBr is insignificant.

**2016**

Show by calculation whether a precipitate of Ag2CO3 will form when 20.0 mL of 0.105 mol L–1 silver

nitrate, AgNO3, solution is added to 35.0 mL of a 0.221 mol L–1 sodium carbonate, Na2CO3, solution.

*K*s(Ag2CO3) = 8.10 × 10–12 at 25ºC

**2015**

Show, by calculation, that a precipitate of lead(II) hydroxide, Pb(OH)2, will form when 25.0 mL of a sodium

hydroxide solution, NaOH, at pH 12.6 is added to 25.0 mL of a 0.00421 mol L–1 lead(II) nitrate, Pb(NO3)2,

solution.

*K*s(Pb(OH)2) = 8.00 × 10–17 at 25°C

**2014**

A sample of seawater has a chloride ion concentration of 0.440 mol L–1.

Determine whether a precipitate of lead(II) chloride will form when a 2.00 g sample of lead(II) nitrate is

added to 500 mL of the seawater.

*K*s(PbCl2) = 1.70 × 10–5 *M*(Pb(NO3)2) = 331 g mol–1

**2012**

Determine whether a precipitate of iron(III) hydroxide, Fe(OH)3, will form when Fe(NO3)3 is dissolved in

water. [Fe(NO3)3] = 1.05 × 10–4 mol L–1.

Assume the pH of the water is 7.

*K*s(Fe(OH)3) = 2.00 × 10–39

**2010**

Discuss how the solubility of Ag2CrO4 will change if it is dissolved in the following solution; 0.1 mol L–1 K2CrO4

*No calculations are necessary.*

**2008**

Sea water contains many dissolved salts. The chloride ion concentration in a sample of sea water is

0.440 mol L–1.

Determine whether a precipitate of lead(II)chloride will form when a 1.00 g sample of lead(II) nitrate is

added to500 mL of the sea water. Your answer must be clearly justified. *M*(Pb(NO3)2) = 331 g mol–1

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