

Worksheet 20.5

Solubility products

- 1 Write equilibrium expressions for the solubility products of the following compounds. In each case, give the units of K_{sp} .
- a MgCO_3 [2]
 - b MgF_2 [2]
 - c Hg_2Cl_2 [2]
 - d $\text{Ca}_3(\text{PO}_4)_2$ [2]
- 2 A saturated solution of nickel(II) hydroxide, $\text{Ni}(\text{OH})_2$, contains 1.00×10^{-4} g of $\text{Ni}(\text{OH})_2$ dissolved in 1 dm^3 of water.
- a Write an equilibrium expression for the solubility product of nickel(II) hydroxide. [1]
 - b Use the A_r values in Data sheet 7 to calculate the value of the solubility product of nickel(II) hydroxide, stating the units. [5]
 - c Nickel(II) sulfide has a solubility of $4.0 \times 10^{-5} \text{ mol dm}^{-3}$ in water. Nickel(II) fluoride has a solubility of $2.65 \times 10^{-1} \text{ mol dm}^{-3}$ in water. What will you observe when 20 cm^3 of an aqueous solution of 0.01 mol dm^{-3} nickel(II) fluoride is added to an equal volume of a saturated solution of nickel(II) sulfide? Explain your answer. [3]
- 3 Barium chromate, BaCrO_4 , is a sparingly soluble salt. $K_{sp} = 1.17 \times 10^{-10} \text{ mol}^2 \text{ dm}^{-6}$.
- a What does the term **solubility product** mean? [2]
 - b Calculate the solubility of barium chromate in pure water. [3]
 - c What does the term **common ion effect** mean? [2]
 - d Calculate the solubility of barium chromate in an aqueous solution of 0.01 mol dm^{-3} barium nitrate. [2]
 - e Explain the difference in your answers to parts **b** and **d**. [2]