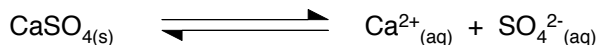


Chemguide – questions

INTRODUCTION TO SOLUBILITY PRODUCTS

1. If you shake solid powdered calcium sulphate with water, the following equilibrium is set up:



The expression for the solubility product of calcium sulphate is $K_{sp} = [\text{Ca}^{2+}_{(aq)}] [\text{SO}_{4}^{2-}_{(aq)}]$

- a) What are the units for the solubility product of calcium sulphate?
- b) The value of the solubility product for calcium sulphate at 298 K is 4.8×10^{-9} (with the units you should have given in (a)). Suppose you mixed solutions of a soluble calcium salt and a soluble sulphate so that the concentrations of each in the resulting solution would be $1 \times 10^{-3} \text{ mol dm}^{-3}$ in the absence of any possible reaction. What would happen? Explain your answer.
- c) Suppose you mixed solutions of a soluble calcium salt and a soluble sulphate so that the concentrations of each in the resulting solution would be $1 \times 10^{-5} \text{ mol dm}^{-3}$ in the absence of any possible reaction. What would happen? Explain your answer.
2. Write expressions for the solubility products (including their units) for each of the following sparingly soluble ionic compounds. You can leave out the state symbols (aq).
- a) lead(II) bromide, PbBr_2
- b) strontium carbonate, SrCO_3
- c) silver(I) chloride, AgCl
- d) silver(I) chromate, Ag_2CrO_4
- e) aluminium hydroxide, $\text{Al}(\text{OH})_3$
- f) lead(II) sulphate, PbSO_4
- g) silver(I) phosphate, Ag_3PO_4
- h) bismuth sulphide, Bi_2S_3