

Mohamed Khider University of Biskra
Faculty of Exact Sciences and Natural and Life Sciences

1st year LMD – SNV Biology
Subject: Chemistry 2

Academic year: 2024/2025

Applied exercises series No. 3

(Solubility - Solubility product)

Exercise 1:

Magnesium hydroxide $\text{Mg}(\text{OH})_2$ is a poorly soluble compound, with a molar mass of 58.3 g/mol and which has a solubility product $K_s = 1.2 \cdot 10^{-11} \text{ mol}^3/\text{l}^3$ at 18 °C.

1. Calculate the solubility of $\text{Mg}(\text{OH})_2$ in grams per liter.
2. Calculate the solubility product of $\text{Ca}_3(\text{PO}_4)_2$, $S = 2.50 \cdot 10^{-3} \text{ g/l}$; $M = 310 \text{ g/mol}$.

Exercise 2:

Bladder (urinary) stones are made up of calcium oxalate, CaC_2O_4 . Calcium oxalate is an ionic solid that is poorly soluble in water.

1. Calculate the molar solubility and mass solubility of CaC_2O_4 .
2. What minimum volume of pure water should be used to dissolve a 1.1 g urinary stone?
3. The water used actually contains calcium chloride at a concentration of 10^{-4} mol/l . In this case, what is the minimum volume of water necessary to dissolve the same urinary stone of 1.1 g?

We give: K_s (calcium oxalate) = $10^{-8.6}$, the molar mass (g/mol) of: Ca(40), C(12), O(16).

Exercise 3:

The solubility product of lead sulfate PbSO_4 is $10^{-8.6}$. Calculate its molar and mass solubility in:

1. Pure water.
2. A solution of lead nitrate $\text{Pb}(\text{NO}_3)_2$ 0.10 mol/l. calculate the new solubility S' , what can we conclude?

We give: the molar mass (g/mol) of the atoms: Pb(207), S(32), O(16).

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Applied exercises series No. 4

(Oxidation-reduction reaction)

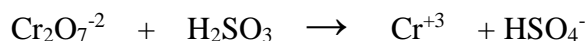
Exercise 1:

- Calculate the degrees (numbers) of oxidation of the underlined atoms:

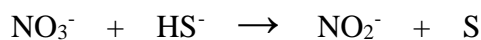
KMnO_4 , HNO_3 , H_3PO_4 , $\text{Cr}_2\text{O}_7^{2-}$, NaH , O_2 , F_2O , I^- .

Exercise 2:

1. Equilibrium the following reaction in an acidic medium:

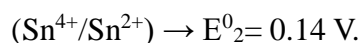
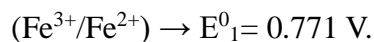


2. Equilibrium the following reaction in an basic medium:



Exercise 3:

1. Express the electrode potential of the Riboflavin-Leucoriboflavin (Rb/RbH_2) system as a function of the pH of the solution at 25 °C.
2. Calculate the equilibrium constant K of the tow following equations:



Exercise 4:

- What is the e.m.f. from the following battery?



We give: the standard potentials of the two couples:

