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Institute of Science and Technology

Department of Mechanical and Electromechanical Engineering Process Engineering 2nd year

**Solution Chemistry practical’s Works**



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**Experiment 6 : Determination of the solubility product of a poorly soluble salt**

We will be possible to manufacture a saturated solution of Ca(OH)2, determine the solubility in pure water and then in a soda solution and determine the solubility product Ks of this salt.

Introduction :

# Consider a saturated solution of a poorly soluble CmAn electrolyte, in the presence of an excess of this body in the solid state. Although the solution is saturated, the concentration is very low. The dissolved molecules of CmAn can be considered fully ionized. This solution is the seat of heterogeneous equilibrium:

# $$C\_{m}A\_{n}→ mC^{n+}+ nA^{m-} $$

**Ks = [Cn+]m [Am-]n.**

Ks is called the solubility product. It is a thermodynamic constant, so it depends only on temperature.

# reagents

Ca(OH)2; HCl 0,1N; NaOH (0,005N); NaOH (0,1N); phenolphthalein

# Procedure:

**Part 1:**Preparation of the saturated solution by dissolving the solid in distilled water.

* Place about 1g of solid in a 100 mL volumetric flask, add the distilled water, stopper and shake vigorously for at least 3 minutes. Let settle.
* Filter the supernatant liquor as needed, the filtrate must be clear, otherwise filter again.
* Reading the temperature
* Take 10 ml of the filtrate and titrate with 0, 1N HCl using the colour indicator.

**Part 2:**preparation of two saturated solutions by dissolving the solid in the soda.

* Introduce 1g of solid into 2 volumetric flask and then add a volume v (taken with a volumetric pipette) of standard solution of soda.
* Shake vigorously and proceed as before to obtain the filtrate and dose it.

# QUESTIONS:

1. Explain the principle of dosage.
2. Write the equilibrium equation and the expression of Ks.
3. Calculate water solubility S0
4. Explain the calculation of solubility S1 and S2.
5. Calculate Ks. Conclude.