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# **PRECIPITATION TITRATIONS CONCEPT AND PRINCIPLE, SOLUBILITY CONCEPT**

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## PRECIPITATION TITRATION

**A special type of titrimetric procedure involves the formation of precipitates during the course of titration. The titrant react with the analyte forming an insoluble material and the titration continues till the very last amount of analyte is consumed. The first drop of titrant in excess will react with an indicator resulting in a color change and announcing the termination of the titration.**





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## **CHARACTERISTICS OF PRECIPITATION TITRATION**

- **They are fast and the stoichiometry is known and reproducible, (no secondary reactions of interference.)**
- **They are complete or can be quantified depending on the amount of solubility product (in general a precipitation titration is considered complete when  $K_{ps} < 10^{-8}$ )**
- **An indicator can be used to find the equivalence point or titration end point which, for this type of titration, corresponds to when precipitation of the analyte under analysis is complete.**



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## **THEORY OF PRECIPITATION TITRATION**

**The main principle of the precipitation titrations is that the quantity of the added precipitating reagent or precipitant is equivalent to the substance being precipitated.**

### **SOLUBILITY PRODUCT**

➤ **The product of molar concentration of ions raised to the power equal to its stoichiometric coefficient presents in the ionic equation In saturated solution at a fixed temperature is called solubility product.**

• **It is denoted by  $K_{sp}$**



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## **SOLUBILITY :**

- **The molar concentration of solute dissolved in solution at saturated condition at any temperature is called solubility .for eg : out of 5 moles of solute ,suppose 2moles of solute is ionized in a one liter solution at any fixed temperature .therefore ,here solubility of solute is equal to 2moleslit.**

## **PRINCIPLE OF PRECIPITATION**

- **The product of concentrations of ions presents in a solution at any fixed temperature is called ionic product of the salt**
- **It is denoted by Q**



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• If the solution is saturated solution then the ionic product is called solubility product of the salt

- “if the ionic product of the salt is greater than that its solubility product value then the precipitation of the salt takes place otherwise not, this is called the principle of precipitation
- Depending upon the values of ionic product, the solutions can be classified into three different categories as follows:
  - i.  $Q=K_{sp}$  ,the solution is just saturated and no precipitation takes place . ii. If  $Q>K_{sp}$  ,the solution is supersaturated and precipitation takes place iii. If  $Q<K_{sp}$  ,the solution is unsaturated and more of the solute can dissolve .so no precipitation takes place at this condition.



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**THANK YOU**