



DPP-14 (Selective Precipitation)

Chapter: Ionic Equilibrium

“Someone else is training while you’re overthinking. Guess who wins?”

GROUP A — IONIC PRODUCT VS K_{sp}

- Q1. In which of the following, the solution of $AgSCN$ will be unsaturated :-**
- (1) $[Ag^+][SCN^-] = K_{sp}$
 - (2) $[Ag^+][SCN^-] < K_{sp}$
 - (3) $[Ag^+][SCN^-] > K_{sp}$
 - (4) $[Ag^+][SCN^-]^2 < K_{sp}$
- Q2. The precipitate of CaF_2 ($K_{sp} = 1.7 \times 10^{-10}$) is obtained when equal volumes of the following are mixed :-**
- (1) $10^{-4} \text{ M } Ca^{2+} + 10^{-4} \text{ M } F^-$
 - (2) $10^{-2} \text{ M } Ca^{2+} + 10^{-3} \text{ M } F^-$
 - (3) $10^{-4} \text{ M } Ca^{2+} + 10^{-3} \text{ M } F^-$
 - (4) $10^{-3} \text{ M } Ca^{2+} + 10^{-5} \text{ M } F^-$
- Q3. When HCl gas is passed through saturated $NaCl$ solution, pure $NaCl$ is precipitated because :-**
- (1) The impurities dissolve in HCl
 - (2) HCl is slightly soluble in water
 - (3) The ionic product $[Na^+][Cl^-]$ exceeds K_{sp} of $NaCl$
 - (4) The solubility product of $NaCl$ is lowered by Cl^- of HCl
- Q4. A solution, containing $0.01 \text{ M } Zn^{2+}$ and $0.01 \text{ M } Cu^{2+}$ is saturated by passing H_2S . $[S^{2-}] = 8.1 \times 10^{-21} \text{ M}$, $K_{sp} ZnS = 3.0 \times 10^{-22}$; $K_{sp} CuS = 8.0 \times 10^{-36}$. Which of the following will occur :-**
- (1) ZnS will precipitate
 - (2) CuS will precipitate
 - (3) Both ZnS and CuS will precipitate
 - (4) Both Zn^{2+} and Cu^{2+} will remain in solution
- Q5. On passing H_2S gas through a solution of Cu^{2+} and Zn^{2+} ions, CuS is precipitated first because :-**
- (1) Solubility product of CuS is equal to the ionic product of ZnS
 - (2) Solubility product of CuS is equal to the solubility product of ZnS
 - (3) Solubility product of CuS is lower than the solubility product of ZnS
 - (4) Solubility product of CuS is greater than the solubility product of ZnS
- Q6. Why only As^{3+} gets precipitated as As_2S_3 and not Zn^{2+} as ZnS in acidic medium :-**
- (1) Enough As^{3+} are present in acidic medium
 - (2) Zinc salt does not ionise in acidic medium
 - (3) Solubility product of As_2S_3 is less than that of ZnS
 - (4) Solubility product changes in presence of an acid

- Q7.** What will happen if the pH of the solution of 0.001 M $\text{Mg}(\text{NO}_3)_2$ solution is adjusted to $\text{pH} = 9$ ($K_{sp} \text{Mg}(\text{OH})_2 = 8.9 \times 10^{-12}$)
- (1) ppt will take place
 - (2) ppt will not take place
 - (3) Solution will be saturated
 - (4) None of these

- Q8.** The solubility product constant K_{sp} of $\text{Mg}(\text{OH})_2$ is 9.0×10^{-12} . If a solution is 0.010 M with respect to Mg^{2+} ion, what is the maximum hydroxide ion concentration which could be present without causing precipitation of $\text{Mg}(\text{OH})_2$:-
- (1) 1.5×10^{-7} M
 - (2) 3.0×10^{-7} M
 - (3) 1.5×10^{-5} M
 - (4) 3.0×10^{-5} M

GROUP B — SELECTIVE PRECIPITATION (FIRST / LAST)

- Q9.** The solubility product of hydroxides of Mg^{2+} , Zn^{2+} , and Fe^{3+} decreases as $K_{sp} \text{Mg}(\text{OH})_2 > K_{sp} \text{Zn}(\text{OH})_2 > K_{sp} \text{Fe}(\text{OH})_3$. The order of precipitation of hydroxides is :-
- (1) $\text{Fe}(\text{OH})_3$, $\text{Zn}(\text{OH})_2$, $\text{Mg}(\text{OH})_2$
 - (2) $\text{Mg}(\text{OH})_2$, $\text{Zn}(\text{OH})_2$, $\text{Fe}(\text{OH})_3$
 - (3) $\text{Zn}(\text{OH})_2$, $\text{Fe}(\text{OH})_3$, $\text{Mg}(\text{OH})_2$
 - (4) $\text{Zn}(\text{OH})_2$, $\text{Mg}(\text{OH})_2$, $\text{Fe}(\text{OH})_3$

- Q10.** The K_{sp} of Ag_2CrO_4 , AgCl , AgBr and AgI are respectively, 1.1×10^{-12} , 1.8×10^{-10} , 5.0×10^{-13} , 8.3×10^{-17} . Which one of the following salts will precipitate last if AgNO_3 is added to a solution containing equal moles of NaCl , NaBr , NaI and Na_2CrO_4 ?
- (1) AgCl
 - (2) AgBr
 - (3) Ag_2CrO_4
 - (4) AgI

GROUP C — PRECIPITATION REQUIREMENT (K_{sp} Condition)

- Q11.** The solubility product of BaSO_4 at 25°C is 1.0×10^{-9} . What concentration of H_2SO_4 is needed to precipitate BaSO_4 from 0.01 M Ba^{2+} solution :-
- (1) 10^{-9}
 - (2) 10^{-8}
 - (3) 10^{-7}
 - (4) 10^{-6}
- Q12.** A solution is a mixture of 0.06 M KCl and 0.06 M KI . AgNO_3 is added till AgCl just starts precipitating. ($K_{sp} \text{AgCl} = 1 \times 10^{-10}$; $K_{sp} \text{AgI} = 4 \times 10^{-16}$). The concentration of iodide ion at this stage will be :-
- (1) 4.0×10^{-5} M
 - (2) 2.4×10^{-7} M
 - (3) 2.0×10^{-8} M
 - (4) 4.0×10^{-8} M