Ionic Solubilities and Equations
Checkup 2

1.
 (a) Cd^{2+} (c) Ag^+
 (b) N^{3-} (d) HCO_3^-

2.
 (a) $Cu_3(PO_4)_2$ insoluble   (d) NiI_2 soluble
 (b) $(NH_4)_2SO_4$ soluble   (e) $Sn(NO_3)_2$ soluble
 (c) K_2S soluble   (f) $HgCO_3$ insoluble
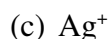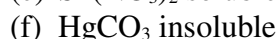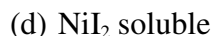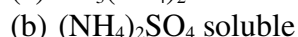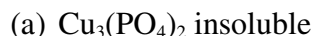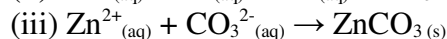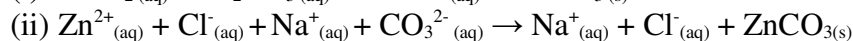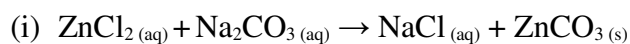
3.
 •   insoluble with fluoride – must be calcium, magnesium, lead(II), or barium
 •   insoluble with hydroxide – cannot be barium
 •   soluble with chromate – must be magnesium or calcium
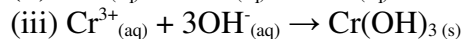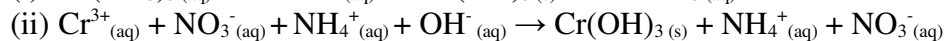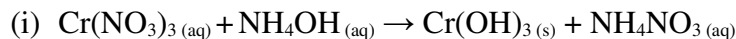 •   soluble with sulphate – cannot be calcium
It is most likely to be <u>magnesium</u>, since in this experiment calcium would form a precipitate with sulfate.

4.
 (a)
  (i) $ZnCl_{2\ (aq)} + Na_2CO_{3\ (aq)} \rightarrow NaCl_{\ (aq)} + ZnCO_{3\ (s)}$
  (ii) $Zn^{2+}_{\ (aq)} + Cl^-_{\ (aq)} + Na^+_{\ (aq)} + CO_3^{2-}_{\ (aq)} \rightarrow Na^+_{\ (aq)} + Cl^-_{\ (aq)} + ZnCO_{3(s)}$
  (iii) $Zn^{2+}_{\ (aq)} + CO_3^{2-}_{\ (aq)} \rightarrow ZnCO_{3\ (s)}$
 (b)
  (i) $Cr(NO_3)_{3\ (aq)} + NH_4OH_{\ (aq)} \rightarrow Cr(OH)_{3\ (s)} + NH_4NO_{3\ (aq)}$
  (ii) $Cr^{3+}_{\ (aq)} + NO_3^-_{\ (aq)} + NH_4^+_{\ (aq)} + OH^-_{\ (aq)} \rightarrow Cr(OH)_{3\ (s)} + NH_4^+_{\ (aq)} + NO_3^-_{\ (aq)}$
  (iii) $Cr^{3+}_{\ (aq)} + 3OH^-_{\ (aq)} \rightarrow Cr(OH)_{3\ (s)}$

Bonus:

A) Triiodide is polyatomic, because there is more than one atom covalently bonded together in each ion. It is unusual because polyatomic ions normally have more than one element in them, for example nitrate (NO_3^-) has nitrogen *and* oxygen. Iodine usually forms iodide ion (I^-) so NaI_3 is made up of Na^+ and $3I^-$, so the iodine atoms are separate from each other.

B) In dissociation, the negative and positive ions move away from each other.
   Dissociation example: $NaCl \rightarrow Na^+ + Cl^-$.
In ionisation, there are no ions to start with, they are formed in the reaction.
   Ionisation example: $HCl \rightarrow H^+ + Cl^-$