

***Determining the Solubility of Ionic Compounds***

Though up to this point we have generally considered that ionic compounds are soluble in polar solvents such as water, in actuality ionic solids show a wide range of solubility in water. However there are some general “rules” which we can use to determine the solubility of ionic solids in water. **These rules are shown in the Solubility Rules table, Chart F on page 4 of your yellow reference packet.**

***Practice Problems*** Write the correct formula for the ionic compound formed from the pair of ions and use the Solubility Rules to determine whether the resulting ionic compounds are aqueous or solid in water.

Ions	Formula (Criss-cross charges)	(aq)/(s)?	Ions	Formula (Criss-cross charges)	(aq)/(s)?
1. $\text{Ag}^+ + \text{NO}_3^-$	$\text{AgNO}_3$	(aq)	11. $\text{Hg}_2^{2+} + \text{Cl}^-$	$\text{Hg}_2\text{Cl}_2$	(s)
2. $\text{Cu}^{2+} + \text{NO}_3^-$	$\text{Cu}(\text{NO}_3)_2$	(aq)	12. $\text{NH}_4^+ + \text{S}^{2-}$	$(\text{NH}_4)_2\text{S}$	(aq)
3. $\text{Pb}^{2+} + \text{I}^-$	$\text{PbI}_2$	(s)	13. $\text{Al}^{3+} + \text{SO}_4^{2-}$	$\text{Al}_2(\text{SO}_4)_3$	(aq)
4. $\text{K}^+ + \text{PO}_4^{3-}$	$\text{K}_3\text{PO}_4$	(aq)	14. $\text{Fe}^{3+} + \text{OH}^-$	$\text{Fe}(\text{OH})_3$	(s)
5. $\text{Ba}^{2+} + \text{SO}_4^{2-}$	$\text{BaSO}_4$	(s)	15. $\text{Cd}^{2+} + \text{SO}_3^{2-}$	$\text{CdSO}_3$	(s)
6. $\text{Rb}^+ + \text{CO}_3^{2-}$	$\text{Rb}_2\text{CO}_3$	(aq)	16. $\text{Pb}^{2+} + \text{ClO}_4^-$	$\text{Pb}(\text{ClO}_4)_2$	(aq)
7. $\text{Cu}^{2+} + \text{I}^-$	$\text{CuI}_2$	(s)	17. $\text{Ni}^{2+} + \text{C}_2\text{O}_4^{2-}$	$\text{NiC}_2\text{O}_4$	(s)
8. $\text{Sr}^{2+} + \text{CrO}_4^{2-}$	$\text{SrCrO}_4$	(s)	18. $\text{Mg}^{2+} + \text{F}^-$	$\text{MgF}_2$	(s)
9. $\text{Ca}^{2+} + \text{C}_2\text{H}_3\text{O}_2^-$	$\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$	(aq)	19. $\text{NH}_4^+ + \text{PO}_4^{3-}$	$(\text{NH}_4)_3\text{PO}_4$	(aq)
10. $\text{Au}^{3+} + \text{Cl}^-$	$\text{AuCl}_3$	(aq)	20. $\text{Ru}^{3+} + \text{Br}^-$	$\text{RuBr}_3$	(aq)