

Solubility Rules Applications Summary Sheet

Many (but not all) ionic compounds dissolve in water and separate into ions. When dissolved, these substances are more accurately described by the ions (charged particles) that are formed, and when these dissolved ionic compounds participate in a chemical reaction, they should be represented as ions in a balanced chemical equation. Such equations are called net ionic equations.

Important: only **ionic compounds that dissolve** should be represented this way. All ionic compounds do not dissolve. The chart below indicates some rules that can be applied to determine which substances dissolve and should be represented as ions in solution.

Soluble

- Nitrates
- Salts containing alkali metals (Li+, Na+, K+, Rb+, Cs+)
- Salts containing ammonium (NH₄⁺)
- Chlorates and perchlorates
- Acetates
- Chlorides, bromides & iodides EXCEPT for those that contain Ag, Hg or Pb
- Sulfates EXCEPT those that contain Pb, Ba, Sr, and Ca (PBS/CBS)

Not Soluble

(UNLESS they contain Na+, K+, Li+, Rb+, Cs+ or NH₄⁺ (see rules 2 & 3 above))

- Hydroxides*
- Oxides*
- Sulfides
- Sulfites
- Carbonates
- Chromates
- Phosphates

Tips: (continues on the back)

1 – when separated into ions, the charges must be accurately shown

2 – the subscripts on ions in a chemical formula become coefficients on the ions when it separates:

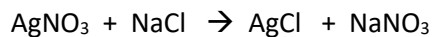


3 – only ionic compounds separate into ions (never anything covalent)

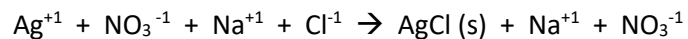
NH_4Cl becomes NH_4^{+1} and Cl^{-1} but N_2ClO does not separate

4 – ionic compounds that are insoluble will be solid (s) and do not separate

5 – in chemical equations, any ions that are unchanged will be removed as spectators:



Separate all ionic compounds that dissolve: (check solubility rules to see that AgCl does not dissolve)



Then remove any spectators to get the net ionic equation:

