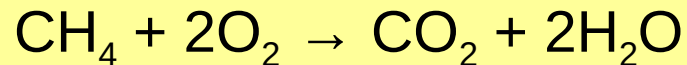


Essential Question

Which particles actually react?

Balanced Equations Conserve Atoms

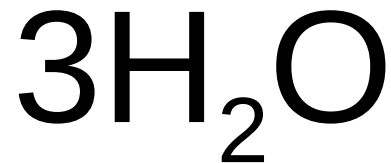
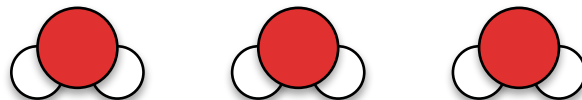
- Same number of each atom on both sides
- Mass and charge are conserved



Atom	Reactants	Products
C		
H		
O		

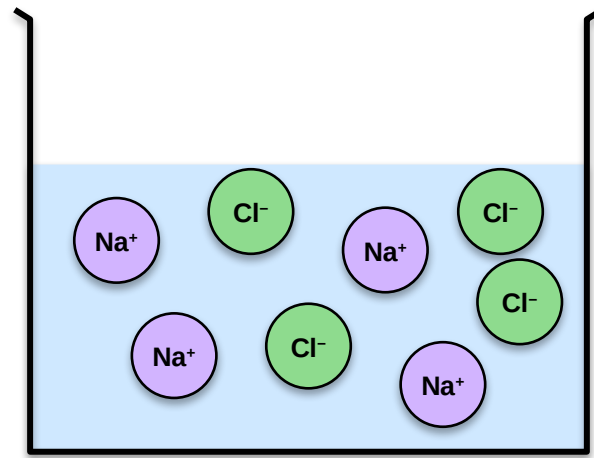
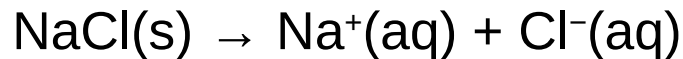
Coefficients vs. Subscripts

- Coefficient: how many units
- Subscript: atoms in one unit
- Balance with coefficients only



Ionic Compounds in Water

- Soluble ionic compounds split into ions
- Strong acids split into ions too



Solubility Rules for AP Chemistry

- Only one rule to memorize
- Compounds with these ions are always (aq)
- No “always solid” list on the AP exam



sodium



potassium



ammonium

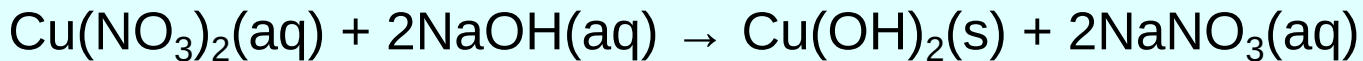


nitrate

Always soluble = always (aq)

Finding the Precipitate

- AP tells you when a solid forms
- Product with Na^+ , K^+ , NH_4^+ , or $\text{NO}_3^- \rightarrow (\text{aq})$
- The other product $\rightarrow (\text{s})$
- Comparing other salts? AP gives K_{sp} values



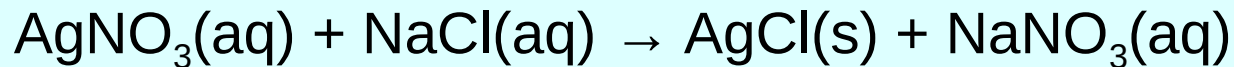
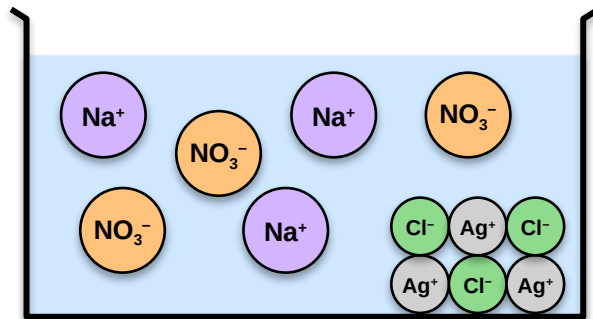
Not on the list

must be the solid

Na^+ and NO_3^-
always (aq)

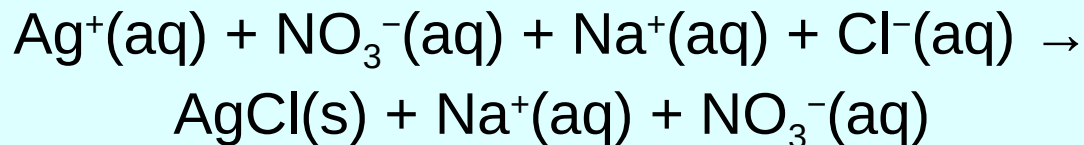
Molecular Equation

- Every substance written as a whole formula
- Hides what is really in the solution



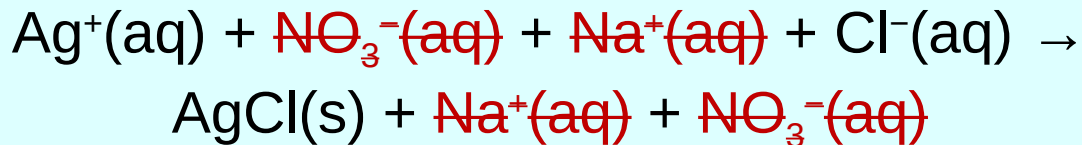
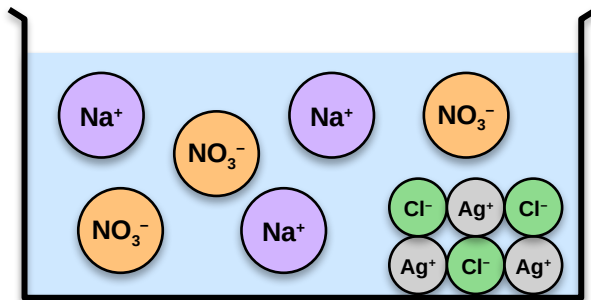
Complete Ionic Equation

- Split aqueous strong electrolytes into ions
- Keep solids, liquids, gases, and weak acids together



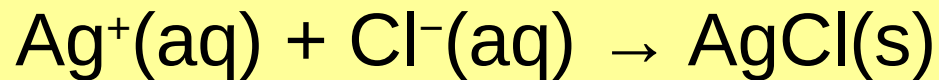
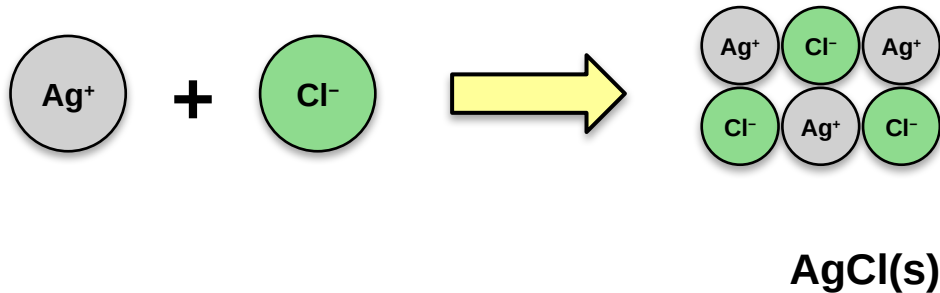
Spectator Ions

- Ions unchanged on both sides
- They do not react, so cancel them



Net Ionic Equation

- Shows only the species that change
- Check: atoms AND charge balance



Steps for a Net Ionic Equation

1

Balance the
molecular
equation



2

Split (aq)
strong
electrolytes



3

Cancel
spectator ions

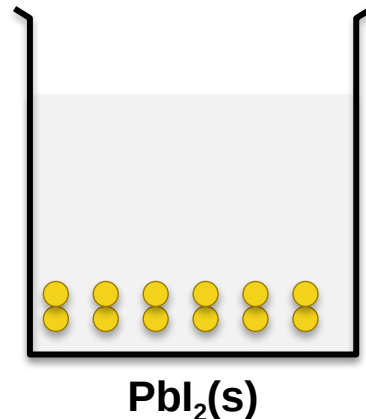


4

Check atoms
and charge

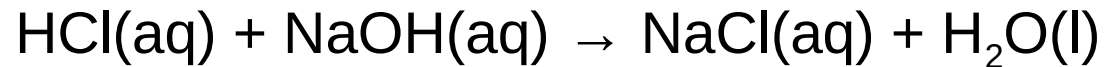
Example: Lead(II) Nitrate + Potassium Iodide

Write the net ionic equation for the reaction of aqueous lead(II) nitrate with aqueous potassium iodide, which forms solid lead(II) iodide.



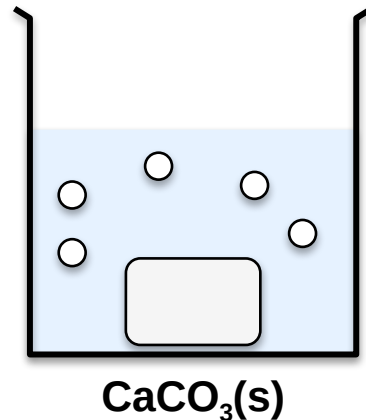
Example: Hydrochloric Acid + Sodium Hydroxide

Write the net ionic equation for this reaction:



Example: Calcium Carbonate + Hydrochloric Acid

Solid calcium carbonate reacts with hydrochloric acid to form aqueous calcium chloride, water, and carbon dioxide gas. Write the net ionic equation.



Big Ideas

- Conserve atoms, mass, and charge
- Split (aq) strong electrolytes
- Cancel spectator ions
- Net ionic: only what changes

