

# Ionic equations

## 1 What are ionic equations?

- chemical equ. which only include ions formed / changed
- ie 只包括真正参与 reaction 的物质
- steps
  1. 写一次已经 balanced 的 equation
  2. 把 aqueous 的物质拆开成 ion
  3. 把没改变过的 ion 删走  $\rightarrow$  spectator ion
  4. 确保两边 charge 的数量相等

## 2 Examples



- $3\text{Mg}(\text{cs}) + \text{Al}_2(\text{SO}_4)_3 \text{ (aq)} \rightarrow 3\text{MgSO}_4 \text{ (aq)} + 2\text{Al}(\text{cs})$
- $\Rightarrow 3\text{Mg} + 2\text{Al}^{3+} \rightarrow 3\text{Mg}^{2+} + 2\text{Al} \rightarrow \text{SO}_4^{2-}$  没变过
- $\text{LHS} = 0 + 2 \cdot (+3) = +6$   
 $\text{RHS} = 3 \times (+2) + 0 = +6$



- $\text{Ca}(\text{cs}) + 2\text{HCl}(\text{aq}) \rightarrow \text{CaCl}_2(\text{aq}) + \text{H}_2(\text{g})$
- $\Rightarrow \text{Ca} + 2\text{H}^+ \rightarrow \text{Ca}^{2+} + \text{H}_2 \rightarrow \text{Cl}^-$  没变过,  $\text{H}_2$  不能拆
- $\text{LHS} = 2 \times (+1) = +2$   
 $\text{RHS} = 1 \times (+2) = +2$



- $\text{Pb}(\text{NO}_3)_2 \text{ (aq)} + \text{Na}_2\text{SO}_4 \text{ (aq)} \rightarrow \text{PbSO}_4(\text{s}) + 2\text{NaNO}_3 \text{ (aq)}$
- $\Rightarrow \text{Pb}^{2+} + \text{SO}_4^{2-} \rightarrow \text{PbSO}_4 \rightarrow \text{PbSO}_4$  为 solid, 不能拆  
 $2\text{Na}^+$  与  $\text{NO}_3^-$  没变过
- $\text{LHS} = (+2) + (-2) = 0$   
 $\text{RHS} = 0$