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 删去 → spectator ion
4. 确保两边 charge 的数量相等

2 Examples

$Mg + Al_2(SO_4)_3$

- $3Mg_{(s)} + Al_2(SO_4)_{3\,(aq)} \rightarrow 3MgSO_{4\,(aq)} + 2Al_{(s)}$

$\Rightarrow$ $3Mg + 2Al^{3+} \rightarrow 3Mg^{2+} + 2Al$ → SO_4^{2-} 没变过

- LHS = $0 + 2 \cdot (+3) = +6$
  RHS = $3 \times (+2) + 0 = +6$

$Ca + HCl$

- $Ca_{(s)} + 2HCl_{(aq)} \rightarrow CaCl_{2\,(aq)} + H_{2\,(g)}$

$\Rightarrow$ $Ca + 2H^+ \rightarrow Ca^{2+} + H_2$ → Cl^- 没变过，H_2 不能拆

- LHS = $2 \times (+1) = +2$
  RHS = $1 \times (+2) = +2$

$Pb(NO_3)_2 + Na_2SO_4$

- $Pb(NO_3)_{2\,(aq)} + Na_2SO_{4\,(aq)} \rightarrow PbSO_{4\,(s)} + 2NaNO_{3\,(aq)}$

$\Rightarrow$ $Pb^{2+} + SO_4^{2-} \rightarrow PbSO_4$ → $PbSO_4$ 为 solid，不能拆
$2Na^+$ 与 NO_3^- 没变过

- LHS = $(+2) + (-2) = 0$
  RHS = 0