

Chemical Reactions

Ch. 8

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Describing Chemical Change

- Word Equations

Reactants → Products

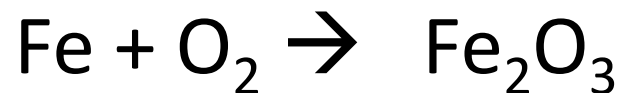
iron + oxygen → iron (III) oxide

hydrogen peroxide → water + oxygen

paper + oxygen → carbon dioxide + water

Describing Chemical Change

- Chemical Equations



Symbols Used on Chemical Equations

Table 8.1, p. 206

“+” used to separate two reactants or products

“→” indicates a reaction has occurred/“yields”

“ $X_{(s)}$ ” element X occurs as a solid

“ $X_{(l)}$ ” element X occurs as a liquid

“ $X_{(g)}$ ” element X occurs as a gas

“ $X_{(aq)}$ ” element X occurs as an aqueous solution

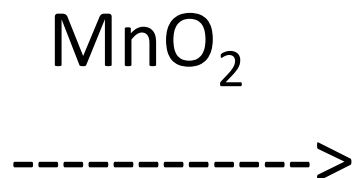
Symbols Used on Chemical Equations

Table 8.1, p. 206 (cont'd.)

To show that heat is added in the reaction:



To show that a **catalyst** makes the reaction occur:



Balancing Chemical Equations

“Law of Conservation of Matter (Mass)”

In chemical reactions, matter cannot be lost or created.

total mass of reactants = total mass of products

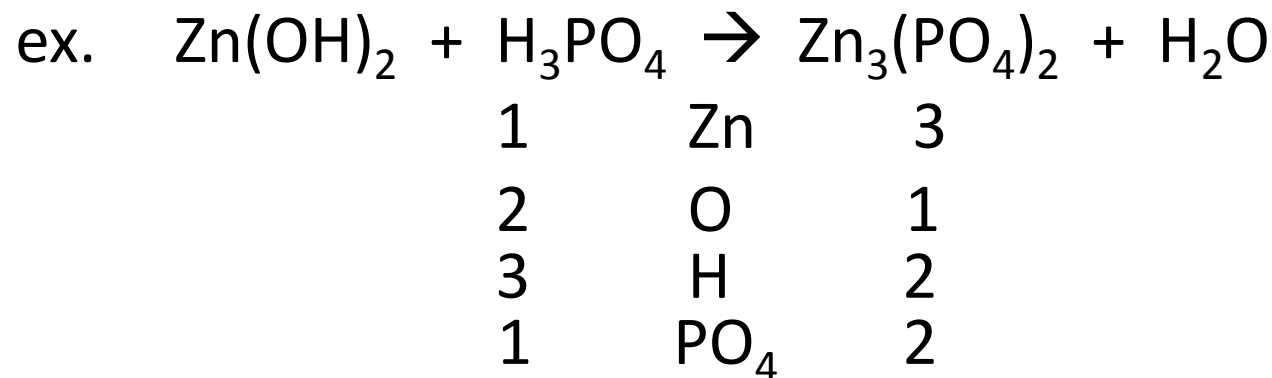
number of atoms in reactants =
number of atoms in products

Rules for Balancing Chemical Equations

- 1) Determine correct formulas for all reactants and products
- 2) Write reactants on the left of the arrow
put “+” between two or more
Write products on the right of the arrow
put “+” between two or more

Rules for Balancing Chemical Equations

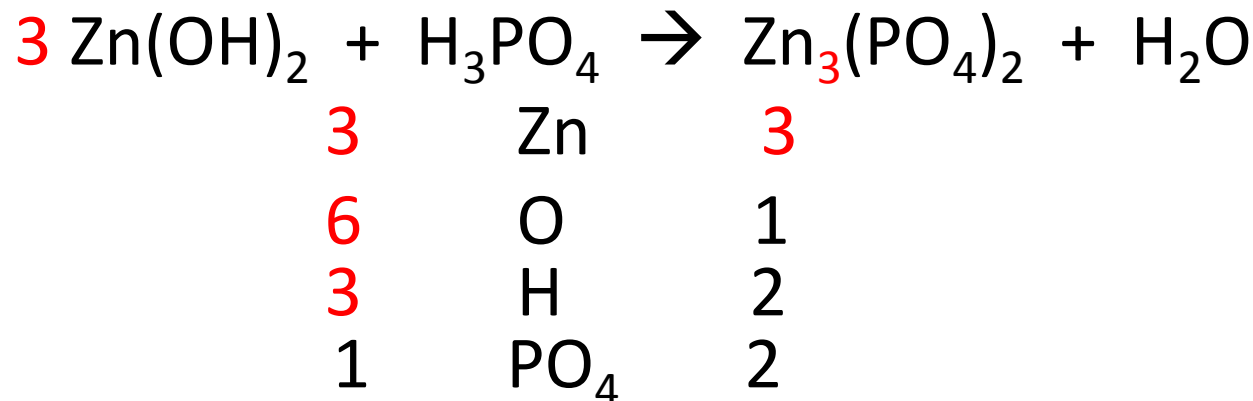
- 3) Count the number of atoms of each element in the reactants and products
Keep polyatomic ions together as a unit
If no coefficient or subscript, assume it is 1



Rules for Balancing Chemical Equations

4. Balance the elements/polyatomic ions one at a time using the coefficients

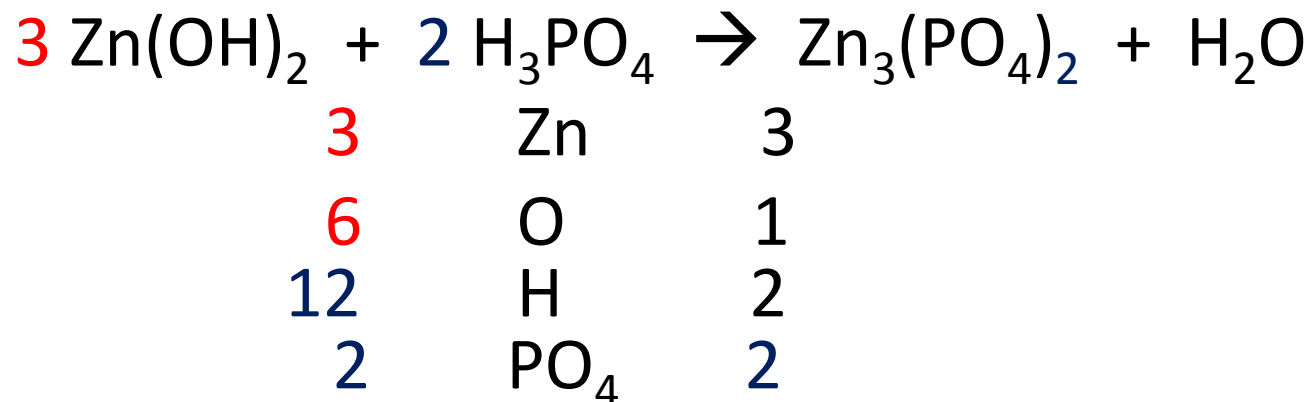
A. Start by changing coefficient for Zn to **3**



Rules for Balancing Chemical Equations

4. Balance the elements/polyatomic ions one at a time using the coefficients

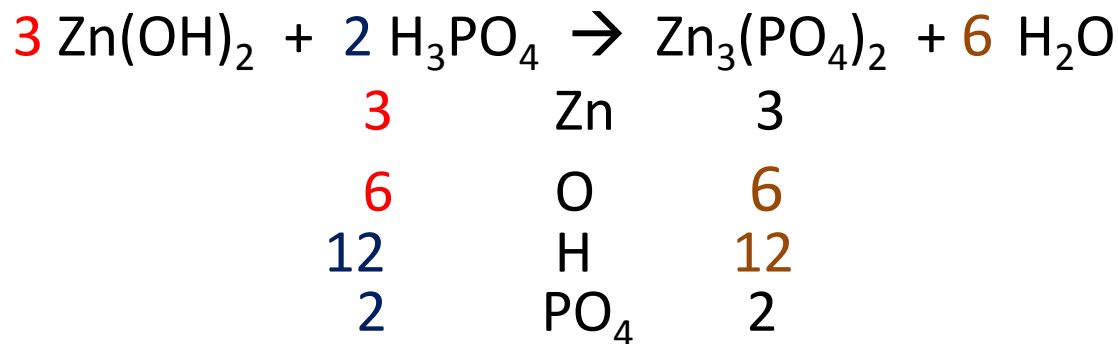
B. Next, changing coefficient for H_3PO_4 to 2



Rules for Balancing Chemical Equations

4. Balance the elements/polyatomic ions one at a time using the coefficients

C. This leaves the H and O in the products unbalanced, but it is easy to adjust this by adding a coefficient (here, use 6 because there are 6 O and 12 H)



Rules for Balancing Chemical Equations

5. Check again that all elements and/or polyatomic atoms are balanced (in the lowest possible ratio)

