

Chemistry Equations and Answers (Speedy Study Guides)

SPEEDY STUDY GUIDES

CHEMISTRY EQUATIONS AND ANSWERS

BALANCING CHEMICAL EQUATIONS

The law of conservation of mass dictates that the quantity of each element does not change in a chemical reaction. Thus, each side of the chemical equation must represent the same quantity of any particular element. Likewise, the charge is conserved in a chemical reaction. Therefore, the same charge must be present on both sides of the balanced equation.

One balances a chemical equation by changing the scalar number for each chemical formula. Simple chemical equations can be balanced by inspection, that is, by trial and error. Another technique involves solving a system of linear equations.

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As seen from the equation $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$, a coefficient of 2 must be placed before the oxygen gas on the reactants side and before the water on the products side in order for, as per the law of conservation of mass, the quantity of each element does not change during the reaction.

As an example, seen in the above image, the burning of methane would be balanced by putting a coefficient of 1 before the CH_4 .

$$1 \text{ CH}_4 + 2 \text{ O}_2 \rightarrow \text{CO}_2 + 2 \text{ H}_2\text{O}$$

Since there is one carbon on each side of the arrow, the first atom (carbon) is balanced.

Looking at the next atom (hydrogen), the right-hand side has two atoms, while the left-hand side has four. To balance the hydrogens, 2 goes in front of the H_2O , which yields:

$$1 \text{ CH}_4 + 2 \text{ O}_2 \rightarrow \text{CO}_2 + 2 \text{ H}_2\text{O}$$

Inspection of the last atom to be balanced (oxygen) shows that the right-hand side has four atoms, while the left-hand side has two. It can be balanced by putting a 2 before O_2 , giving the balanced equation:

$$\text{CH}_4 + 2 \text{ O}_2 \rightarrow \text{CO}_2 + 2 \text{ H}_2\text{O}$$

This equation does not have any coefficients in front of CH_4 and CO_2 , since a coefficient of 1 is dropped.

IONIC EQUATIONS

An ionic equation is a chemical equation in which electrolytes are written as dissociated ions. Ionic equations are used for single and double displacement reactions that occur in aqueous solutions. For example in the following precipitation reaction:

$$\text{CaCl}_2(\text{aq}) + 2\text{AgNO}_3(\text{aq}) \rightarrow \text{Ca}(\text{NO}_3)_2(\text{aq}) + 2\text{AgCl}(\text{s})$$

the full ionic equation is:

$$\text{Ca}^{2+}(\text{aq}) + 2\text{Cl}^{-}(\text{aq}) + 2\text{Ag}^{+}(\text{aq}) + 2\text{NO}_3^{-}(\text{aq}) \rightarrow \text{Ca}^{2+}(\text{aq}) + 2\text{NO}_3^{-}(\text{aq}) + 2\text{AgCl}(\text{s})$$

In this reaction, the Ca^{2+} and the NO_3^{-} ions remain in solution and are not part of the reaction. That is, these ions are identical on both the reactant and product side of the chemical equation. Because such ions do not participate in the reaction, they are called spectator ions. A net ionic equation is the full ionic equation from which the spectator ions have been removed. The net ionic equation of the preceding reaction is:

$$2\text{Cl}^{-}(\text{aq}) + 2\text{Ag}^{+}(\text{aq}) \rightarrow 2\text{AgCl}(\text{s})$$

or, in reduced balanced form,

$$\text{Ag}^{+}(\text{aq}) + \text{Cl}^{-}(\text{aq}) \rightarrow \text{AgCl}(\text{s})$$

In a neutralization or acid-base reaction, the net ionic equation will usually be:

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Reviews

This sort of book is every little thing and got me to searching ahead and a lot more. This can be for all those who statte there was not a well worth reading through. I am just easily could possibly get a delight of reading through a published pdf.
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