

The Chemistry of Combustion and Extinction

What is combustion?

Combustion is known as the scientific term for burning. Essentially, combustion is a chemical reaction whereby oxygen combines with a substance (usually referred to as a fuel) to produce heat and light in the form of a flame. Combustion reactions occur at high temperatures. Combustion is an example of an exothermic reaction; an exothermic reaction is a type of reaction in which energy becomes released into the surroundings. The energy released is typically thermal energy, however, both light and sound energy can be released. Flames have a complex structure and a definable composition; flames are deemed to be multiform and have the ability of existing at rather low temperatures, along with extremely high temperatures. A flames emission light tends to be the result of the presence of excited particles and generally, of charged atoms, electrons and molecules. The products of combustion reactions are compounds of oxygen (O), known as oxides. The products of a complete combustion reaction involve carbon dioxide (CO₂) and water vapor (H₂O). If there is plenty of air, then complete combustion will take place. The typical equation for a complete combustion reaction is as follows:



An example of this is methane (a natural gas (CH₄)). Below is the equation of its complete combustion:

methane + oxygen → water + carbon dioxide



However, if there isn't enough oxygen or air for complete combustion to take place, incomplete combustion will instead take place. Carbon dioxide and water vapour are still produced, but, two other different products are produced, these are; carbon monoxide (CO) this is a colourless toxic gas and also particles of carbon, these can appear as smoke and soot which can cause breathing problems.

The Fire Triangle

The fire triangle is one of the simplest method of understanding the elements of fire. Although its called a fire triangle, occasionally it is called a fire tetrahedron the reason for this will be explained below. This is because in reality for things **MUST BE** present at the **SAME TIME** in order for a fire. The three main elements needed for a fire is **Air**, **Fuel** and **heat** these are frequently referred to as the "fire triangle". The occasional fourth is a **chemical chain reaction**, this is what creates the "fire tetrahedron." An important thing to remember is; if one of just any of these elements get removed, a fire no longer has the ability to burn and will be extinguished.



This is the fire triangle.



This is the fire tetrahedron.

Principles of Combustion

1. There must be Fuel to burn.
2. There must be Air to oxygen to be supplied.
3. There must be Heat to start and continue the process of combustion.

Unit 36 Forensic Fire Investigation Edexcel

Minjie Lin



Unit 36 Forensic Fire Investigation Edexcel:

Unit 36 Forensic Fire Investigation Edexcel Book Review: Unveiling the Magic of Language

In an electronic digital era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is really remarkable. This extraordinary book, aptly titled "**Unit 36 Forensic Fire Investigation Edexcel**," published by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound impact on our existence. Throughout this critique, we will delve into the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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