



OPINION ARTICLE



Applications and Factors that Affect the Oxidants

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Description

The compound or element that is present in a redox (oxidation-reduction) reaction is called the oxidizing agent. From a different species, this receives electrons. The oxidant is a chemical compound that easily transfers another substance or atoms of oxygen in order to gain an electron. If one agent in the reaction gains electrons, hydrogen, or releases oxygen, it is considered an oxidizer. The oxidizer is decreased as it takes on electrons. However, the oxidizer captures its electrons when the reactant undergoes oxidation. The eponymous example of an oxidizing agent is oxygen. An oxidizing agent is also known as an oxidant or oxidizer.

Oxidation and Reduction are two symmetric processes that always take place together. There is a reducing agent as well in the presence of an oxidizing agent. Both are always present, and if oxidation is required, it is beneficial to make use of an agent that will complete the oxidation process. Some useful oxidizers are antiseptics like bleaches and hydrogen peroxide. One major drawback of oxidation is the oxygen action in the process of metal corrosion. Some best oxidizing agents include:

- Oxygen
- Hydrogen peroxide
- Sulphuric acid
- Nitrous oxide
- Peroxydisulfuric acid
- Potassium nitrate

An oxidizer is not that combustible, but it is a substance that possibly releases oxygen and also contributes to certain materials' combustion. Due to this reason, there are also those that are not considered dangerous while there are materials categorized as dangerous oxidizing agents.

Factors that affect the oxidizing power of an oxidizing agent

Oxidizing agents have a strong tendency to gain electrons and undergo reduction because they normally exist in their highest possible oxidation states. Molecules, ions, and atoms have

a strong affinity towards electrons, so they are considered to be good oxidizers. The stronger the oxidizing powers greater the electron affinity.

The strongest elemental oxidizing agent is elemental fluorine. Also in the modern periodic table fluorine is the most electronegative element, so it exerts the strongest attractive force on electrons amongst all the elements. In fact, the oxidizing power of diatomic fluorine (F_2) is strong enough to cause metals such as quartz and asbestos (and even molecules, such as water) to burst into flames when exposed to it.

Diatomic oxygen (O_2), diatomic chlorine (Cl_2), and ozone (O_3) are a few other examples of elemental oxidizing agents. For the second and the third most electronegative elements (oxygen and chlorine respectively), these oxidizers are the elemental forms as they make them good electron acceptors.

Effect of oxidants in human health

Oxidative stress can cause cell, protein, and DNA damage, which contributes to aging. It may also play a role in the development of a variety of health conditions such as diabetes, cancer, and neurodegenerative diseases like Alzheimer's.

Applications of Oxidizing Agents

Applications of Oxidizing Agents are used in a wide range of commercial and industrial applications. A selection of these applications is provided below.

- Bleaching of fabrics.
- Purification of water.
- The use of an oxidizing agent is because of the combustion of fuel.
- Storage of energy in batteries.
- Rubber Vulcanization (increasing the strength and the elasticity of rubber).
- To many biological processes, oxidizing agents is vital such as photosynthesis and metabolism.

To collect energy from the redox reactions such as in the process of hydrolysis of glucose many organisms make use of oxidizers or electron acceptors.