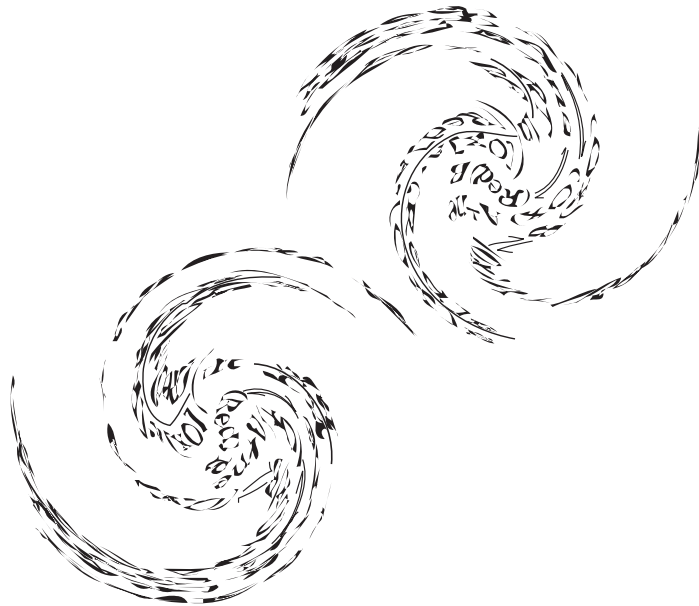


Heavenly Providence

Chapter 6

Oxidation and Reduction Potential
Is An Universal Theme



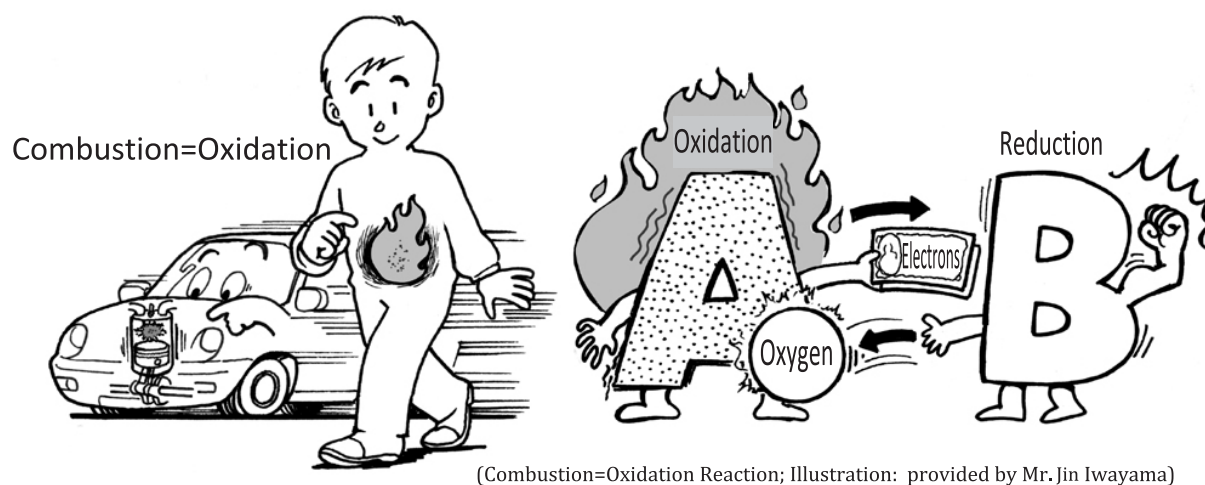
The Mystery of Oxidation and Reduction Reaction

We who dwell in the earth environment are living in the natural world called oxidation and reduction reaction. In the academic books, it is written that the oxidation and reduction reaction is the most fundamental of all the processes that occur in the natural world, including organisms.

Humans cannot live without oxygen. On the other hand, it is becoming clearer, in the combustion reaction of things and in energy combustion reaction of living bodies, that this oxygen also steals life and determines our health as we are affected by the oxidation and reduction reaction that is happening in the realm of food, clothing and shelter.

The red charcoal burning inside of *hibachi*, a charcoal brazier, is a combustion. What's making the cylinder move inside the car engine with gasoline is combustion as well. Also, what's keeping our human body around the temperature of 36 °C is the same phenomenon called combustion.

Combustion means that the material A (mainly carbon) is oxidized when combining with the oxygen of the material B. Most of the combustion reactions generate heat. In the case of automobile engine, it is the combustion of compression ignition and is a high-temperature oxidation. The combustion inside of the human body is a working of oxygen and it is a low temperature and a calm oxidation reaction.



The opposite of oxidation is reduction and within the chemical reaction, when one side of the material (A) is oxidized, the other side (B) is reduced. The (A) that which received the oxygen was oxidized, and (B) that provided oxygen was reduced.

If I express this in chemical formula it will be:



In other words, material (reductant), (Red)A with reductive condition is oxidized by (Ox)B and becomes (oxidant), (Ox) A with oxidized condition. And material (oxidant), (Ox)B with oxidized condition was reduced and becomes material (reductant), (Red)B with reductive condition.

It means that the material (A) was oxidized and (B) was reduced. This is becoming a little technical but this phenomenon called oxidation and reduction can also be defined as "the movement of electrons (e) that configures material."

If I express this with the chemical formula it will be:



Adding formula (2) and formula (3) gives you formula (1). The "n" within the formula expresses the number of electrons that are involved. I can rephrase it this way: (A) that provided electron was oxidized and (B) that received electron was reduced. This reaction happens simultaneously.

Previously, I have mentioned that the combustion reaction within the organism is oxidation and reduction reaction that involves oxygen, but the oxidation and reduction reaction (ion exchange of electron) that takes place in different parts of the body is very complex and is very difficult to unravel and explain in the current situation.

However, the chemical components of the body fluid in each of the body part, at least, are largely involved in the oxidation and reduction reaction, and if the balance becomes disrupted in any ways, it could most likely lead into conditions such as inflammation and pain.

I believe that these chemical components are aqueous solution composed mainly of enzymes and organic compound of protein, and numerous dissociated trace inorganic substances. I also believe that the content ratio, between the oxidant and reductant of the material that are directly involved in the oxidation and reduction reaction, together with the oxygen that catalyzes, carry an important role to govern the proper combustion reaction.

From this consideration, we, who are writers of this book, believed that by measuring the activity ratio of oxidant and reductant of the body fluid material, we are able to make general evaluations of health and make contributions to our daily health management.

We have applied the method of electrochemical measurements as an objective evaluation method to complete the human saliva ORP meter. The body fluid was placed directly in contact with the inactive electrode (platinum indicator electrode) and the electronic conduction, through the medium of fluid was made to the counter electrode, a silver-silver chloride electrode, was measured by the human saliva ORP meter that measures and calculates the activity ratio between oxidant and reductant.

The value that the human saliva ORP meter gives is theoretically expressed in the chemical formula as:

Nernst Equation

$$E = E_0 + \frac{RT}{nF} \ln \left\{ \frac{[\text{Ox}]_A \cdot [\text{Red}]_B}{[\text{Red}]_A \cdot [\text{Ox}]_B} \right\} \dots\dots\dots(4)$$

- In the formula, E₀: Standard oxidation and reduction potential
- R: Gas constant (8.314 JK⁻¹ mol⁻¹)
- T: Absolute temperature
- n: Number of electrons involved in reaction
- F: Faraday constant (96485 C mol⁻¹)
- [ox]: Oxidation concentration/activity of the material
- [red]: Reduction concentration/activity of the material

According to a description of earth's creation, it has been hypothesized that it has birthed out 4.6 billion years ago. In 2 billion or so years, the earth formed the land and moisture became the rain. It absorbed carbon dioxide as the sunlight continued to cover over the earth. Eventually, the earth started to cool down and it presumably birthed bacteria that absorbed light and exhaled oxygen. The oxygen was developed in the seawater and also in the atmosphere, and on the earth, cells and simple organisms that used oxygen began to appear one after another. And, there was natural selection that brought the present organisms that are intermingling on the earth.

I have already mentioned about the oxidation phenomenon that we all know, such as, 'the nails getting rusted', 'the apples browning', but with battery, a necessity that we use in our daily living, oxidation and reduction reaction happen simultaneously. If I were to explain the principle simply, it means that the electric current flow is an exchange of electron in the electron flow; the oxidation and reduction reaction is occurring in the process.

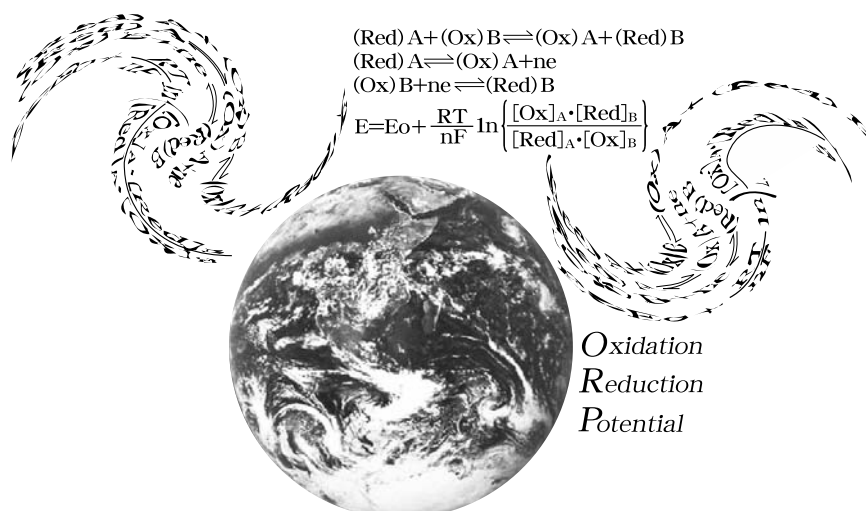
However, the direction of the electric current flow and the electron flow are opposite. The electric current flows from the positive electrode to the negative electrode but electrons flow from the negative electrode to the positive electrode. In other words, when the negative electrons are released (stolen), it is an oxidative reaction, and the reverse action of positive electrons receiving electron is a reductive reaction.

With the human saliva ORP that we are discussing about in this book, we were able to grasp the oxidation and reduction reaction, in units of one thousandth of 1mV, which is a delicate exchange of positive and negative ion that takes place on the electron level of the sample specimen called saliva.

What this means is that, we can now objectively make quantitative judgments on numerous phenomena that are happening in the natural world, to determine whether or not a thing is safe and useful to humans by using the oxidation and reduction potential (ORP) index.

Silk, cotton and other natural materials that do not promote oxidation for clothes, agricultural products without chemical fertilizers, housing construction materials without chemical contamination; in all areas of food, clothing and shelter, the index called oxidation and reduction reaction is becoming more and more important.

I have come to see many things after I started working on the subject of saliva ORP. Together with Mr. Yoshitaka Otomo, who is my co-researcher, we are grateful for the blessings of the whole creation and the natural providence, and we're continuing on with the saliva ORP applied research with joyful heart.



Various Problems, Solutions and Natural Phenomenon Relating to ORP

The patent applications for these researches have been submitted in Japan and the copyright for the United States has been registered already. I will not write in detail of each research but will introduce to you in fragments because they touch on the intellectual property rights.

★First, it is the oxidation problem of the air. The destruction of the natural providence of air production caused by various factors, such as, carbon dioxide (CO₂), chemical contaminations, radioactive contaminations, chemical contaminations of the 'sick building syndrome' and deforestation interfered with the oxygen supplying circulation, which is a prerequisite for the humans and the animals to live is becoming oxidized air.

Carbon dioxide, radiation, PM_{2.5} (fine particle pollution), sick house syndrome¹⁰ are problems, but even if we make a lot of noise about these things, unless we proceed with solutions that alleviate them, we will not be able to live a healthy life receiving the fresh air. Pure air that has been reduced with the natural negative ion, and the lushly green environment of photosynthesis that receives the blessings of the sun are becoming more important.

The humans, who are kept alive in the natural providence, are fragile entities and even losing air alone could make us unable to live for 5 minutes.

The oxygen that are generated artificially are oxygen with positive ions and for humans, this oxygen is only for emergencies just to get by. The oxygen that was produced by the blessing of photosynthesis of plants and sunlight in the natural providence is the oxygen that has negative ions. This oxygen is useful because when the body breathes in these negative ions, it leads the body to reduction.

Some tragic incidences had happened in the past when the premature babies inside the intensive care devices that were providing the babies with high concentration of oxygen, that was generated artificially, developed retinopathy of prematurity. In the world of pediatricians, this is well known.

I have an intuition that the oxygen that is generated by the natural world is oxygen with negative ions and the oxygen that is generated artificially is oxygen with positive ions. When I asked a specialist about this, he told me that in the current situation, it is not possible to artificially generate oxygen with negative ions that is similar to the oxygen that is produced in the nature.

I am currently working on the applied research and collecting data for the 'air oxidation and reduction potential measurement device' that can make fixed-point observations in real time to find which region and which circumstance has the oxygen with negative ions that is useful for humans, animals and plants.

*10 – "Sick house syndrome: the main causal relating factor is pointed out to derive from the volatile organic compound such as formaldehyde and toluene that is dissipated from the construction materials and interior materials. In the internal environment, there are chemical substances such as formaldehyde etc. when subjected to exposure in high concentration could trigger a health hazards such as retinal stimulation symptoms, typical of the symptoms that are caused when it is exposed in high concentration with the chemical substances and organic solutions such as toluene, that will cause headaches and dizziness, even central nerve system damages such as disturbance of consciousness."

(Cited from the publication of Ministry of Health, Labor and Welfare, Environmental Health Division, Feb. 27, 2004)

Oxidation of the air is a serious problem. There are big differences in the value of the oxidative condition and the reductive condition of the air between different places in Japan, such as, Tokyo, Kanagawa Pref., Saitama Pref., Nagano Pref., Kagoshima Pref., and Hawaii, USA.

★Second, it is the modern disease of 'depression' and 'chronic diseases' that are becoming big problems right now. Treatment progress and full recovery of these ailments can be verified by a small quantity of general saliva and local saliva of parotid glands, submandibular glands, sublingual glands and etc., using comparative verification. We are working on the observational verifications and collection of data of the fake depression and fake disease cases by looking at the treatment progress in chronological order. The ratio of the substances that are in the saliva that is generated and secreted from local areas are different from each other, and the beneficial characteristics of each saliva substance and the purpose are getting clearer.



★Third, it is the colored light and the coloring materials. It is well known that if you expose infants to sunlight, their body will get healthy and not catch cold. And, it was verified by saliva ORP that gazing at the sunlight can heighten the immunity of our body.

When dogs and cats receive sunlight, their nose that was dry becomes wet and their vigor get restored. In recent years, people are talking loud about the importance of sun bathing. In our daily life, humans, animals and plants are receiving the blessings of the natural providence by bathing in the sunlight.