

RESEARCH AND DATA SHEETS ON MINERAL REDOX WATER SYSTEM

Contents

1. What is Oxidation-reduction?
2. What is Active Hydrogen?
3. What is Mineral Redox Water?
4. Brochures - RXM [Rexam] MRW-MC2000
5. Introduction of Patented technology

RXM - [Rexam]



What is Oxidation-reduction?

Mineral Redox Water (temporary)

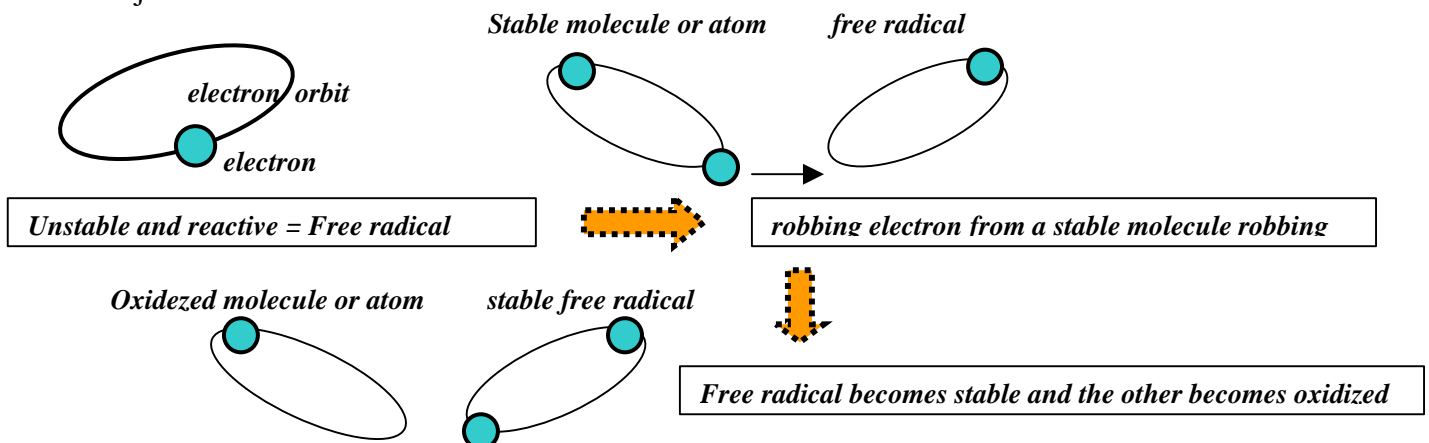
Aquatech Pro technology produces “Mineral Redox Water” that is rejuvenated and empowered water by increasing active hydrogen with rich minerals through our patented Oxidation Reduction process. This patented technology is innovative water treatment system without adding any chemical components to make water the best condition to drink, not only tasty but also greatly beneficial for our health. Simply using tap water or any available drinking water with equipped filtration system and oxidation reduction system, you can enjoy clean, safe, tasty and full of energy water.

What is Active Oxygen and why it could cause disease?

Aging and disease derive from oxidation “rusting” in our body

Oxidation is symptoms of chemical reaction of electrons to be robbed from other objectives by oxygen of some unstable conditions. Even iron of high hardness can become ragged with rust when it gets oxidized in the air. A wood piece becomes ashes after burnt. Used cooking oil gives out a stench when it gets old. These are all results of oxidation. Any Oxygen existing potentially causes oxidation that degenerates objectives and shortens their life-span. Human body is not exception. We inhale oxygen or take it in by food or drink to produce energy in our body. Though oxygen is important element for all living being as a fuel to live, abundant oxygen taken in the body partially changes into active oxygen that would cause oxidation and lead negatively to our health. This “rusting” (oxidation) causes and enhances aging and various diseases.

Active oxygen was found by Dr. D. Herman of Nebraska University in 1956. Further study and research have brought various facts and discovery since. It is found that this active oxygen could oxidize body cells or harm a certain gene to cause cancer or various diseases and it has been said that 90% diseases are related to the active oxygen. Though oxygen is essential to survival for human, when too much is absorbed in the body, it can become active and unstable to attach itself to molecules of healthy cells. About 2% of the oxygen we take in our body becomes active oxygen when breathing, eating and drinking through some foods or drinks. This chemical reaction can work beneficially to us as is being applied usefully in disinfectants such as hydrogen peroxide and ozone to sterilize wounds or medical instruments. Even in the body, these free radicals of active oxygen plays important roles when it functions as an immune system to protect our cells from viruses or bacteria by this powerful free radicals that active oxygen has. The reaction happens in that active oxygen, unstable and having high oxidation potential finds opponents to defeat, tries to become stable itself by stealing electrons from objective cells.



However, when too many of these active oxygen molecules with free radicals are produced, since they are extremely reactive and can also attach themselves to normal, healthy cells, that would damage normal tissue as well. These active oxygen radicals steal electrons from healthy biological molecules. These electrons stolen by active oxygen oxidize tissues and cells in our body and can cause various diseases.

(See <http://www.doctorproctor.com/crcpap2.htm>

<http://www.oralchelation.com/technical/freeradical.htm#harmon>

for more details about free radicals and diseases)

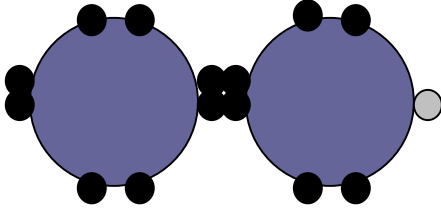
For example, oxidized tissues in **liver** leads to **hepatitis, cirrhosis, or cancer**. In pancreas, leads to **pancreatitis, diabetes, or cancer**. In **kidney**, leads to **nephritis, nephrosis, or cancer**. This *Aquatech Pro technology* provides the effective method applied in water that could support to block the oxidation of healthy tissue by active oxygen before causing disintegration of healthy tissue. Mineral Redox water produced by this technology provides stable active hydrogen of free radicals to neutralize the high oxidation potential of active oxygen and prevent them from damaging healthy tissue. As long as the body produces energy using oxygen in 60 trillions cells of the body at the same time produces active oxygen as well. Following conditions are acknowledged to increase active oxygen in the body:

1. by bathing in Ultra Violet or X-ray
2. stress
3. by taking in chemical contaminants, food additives, or other chemical components
4. by haling air-polluted materials
5. by excessive smoking and drinking
6. by bacteria or virus to cause inflammation

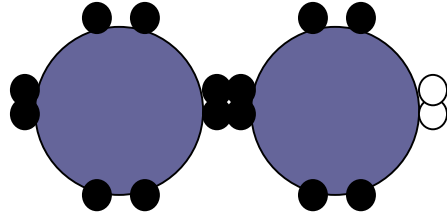
Some kinds of active oxygen

Various kinds of active oxygen are identified by research. First one is super-oxide radicals. This is being produced constantly by burning oxygen to produce energy in the cells. This active oxygen stays in cells for long time. Next is *Hydrogen peroxide*. It is not too reactive itself, however, it becomes highly reactive *Singlet oxygen*, *hydroxyl radical* once it connects to ions of iron or copper in the body. *Singlet oxygen* can be produced by bathing in Ultra-violet ray. It has aggressive oxidation tendency to cause skin cancer or other skin troubles. *hydroxyl radical* has even higher oxidation potential to cause cancer, aging or various diseases, however, it only can stay alive for *1/1 million seconds*.

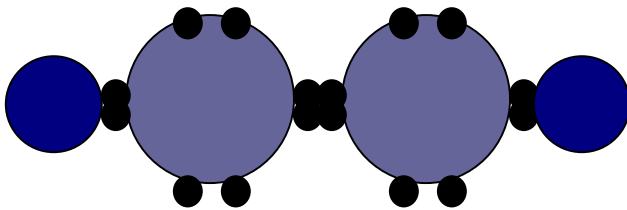
● Hydrogen molecule ○ Unstable electrons
○ Empty electron space ● Electrons



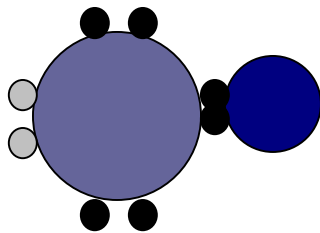
Superoxide radical
 Mostly existing in the body, being produced when oxygen molecules used to provide energy



Singlet oxygen
 Ultra violet ray induced active oxygen. Very active and aggressive due to unstable condition with two electrons missing, constantly changing to various active oxygen



Hydrogen peroxide
 Oxygen molecules connected with hydrogen molecules. Stable as it is, but once reacted to copper or iron ions, it changes to hydroxy radical or singlet oxygen to become strong oxidation influential



Hydroxyl radical
 Most powerful oxidation influence, but can be alive very shortly for 1/2 million to 1 million of a second

Natural removal system in our body is limited

Biological systems protect themselves against the damaging effects of activated species by several means including removal of those active oxygen. These include free radical scavengers and chain reaction terminators: enzymes such as *SOD* (Superoxide dismutase), catalase, and the glutathione peroxidase system; and "solid-state" defenses such as the melanins. Those can treat active oxygen as natural antioxidant system in the body, however, since we produce excessive active oxygen by constantly taking in triggering influence from outside, such as food additives, smoking, ultra-violet rays etc and inside cause of stress or as such, those biological antioxidants are never enough. Also production of those antioxidants decreases as we age. We can supply chemical antioxidants components such as Vitamin C, E, beta carotene (Vitamin A), polyphenol or flavonoid etc. Several minerals also helps those antioxidants as supplements. However, chemical antioxidant defense is a double-edged sword. When an antioxidant scavenges a free radical, its own free radical is formed, then it could become oxidation radical as well. To avoid producing those free radicals of active oxygen, followings should be considered.

1. Reduce environmental burdens in the body chemicals and heavy metals.
2. Reduce stress.
3. Improve quality of the food supply.
4. Increase various antioxidant mechanisms

As an solution to above #4, our *Mineral Redox water* with *active hydrogen* plays a great role more effectively than those chemical antioxidants. It is 100% natural and perfectly safe even when excessively taken in the body unlike those chemical antioxidants.

How active hydrogen removes active oxygen?

Active hydrogen ($\overset{+}{\text{H}}$) is reactive atom with single minus electron. This minus electron will be connected with of active oxygen to make it harmless "H₂O". Great benefit of this active hydrogen is that you can take it limitless since oxygen is abundant enough in your body to react to it simply becoming safe water. As explained, chemical antioxidants such as Vitamin B or Polyphenol would not be the same. Vitamin B, after giving its electron to active oxygen, becomes oxidizing radical itself to rob electrons from other cells. (therefore, Vitamin C is necessary to take together since C gives an electron to B to make it stable) Mineral Redox Water provides active hydrogen absorbed in minerals and delivers into our body surely without being damaged by saliva or stomach acid. And active hydrogen will be carried throughout the body in blood.

(See **What is Active Hydrogen?**)

What is Active Hydrogen?

Active hydrogen and active oxygen

Active Hydrogen is an atomic form of Hydrogen with single minus electron. It is very reactive and high-energy atom. It usually stabilize itself by combining plus H (H^+) and minus H (H^-) as a form of H_2 . Active hydrogen is an atom by dividing those molecules of H_2 . Hydrogen is the first element on the “Periodic Table”, colorless, odorless, tasteless and it is highly explosive if reacts with a certain molecules. But it is too reactive and unstable to exist in natural condition. Unless high energy used, single form of hydrogen atoms cannot exist. In regular tap water, only 0.1 ppb/ml or less of this hydrogen atoms exist. However, *Aquatech ProTechnology* processed water is tested to find it contains over 1 ppb/ml, 10 times more active hydrogen than tap water. This hydrogen in atomic form is considered to deoxidize and destroy the poison of the cell by neutralizing the active oxygen (to become water) which is the cause of various disease. Active oxygen is very active atoms which harm the cells to cause almost 90% of disease. However, to produce this active hydrogen by water reduction process, it usually requires extremely high energy. That is the reason why it does not much exist in nature world. Only *Aquatech ProTechnology* makes it possible to produce this active hydrogen and stay in water for long period.

We call it “Mineral Redox Water”. It is produced by high frequency reduction technology. High frequency current of approximately 30-80 KHz causes water to reduce into oxygen and hydrogen in atomic form. Compared with tap water, which is pretty much oxidized, Redox water by this process becomes very close to natural spring water which took a long time of process in the mountain.

Currently definition of Reduced water is very vague. In true sense, reduced water is not only “deoxidized” which is neutral as water but does not provide any benefit to our body. Reduced water should have active electron exchange between atoms, which is measured by so-called ORP, Oxidation Reduction Potential (mV). The more reduced, the lower the number. Mineral Redox water regularly shows $-100 \sim -300$ mV and -800 mV at its peak. This measurement is the criteria of power to reduce oxidation of water and bring back the healing system of natural water. *Aquatech ProTechnology* applies “alternative current” instead of “direct current” as the other similar makers uses. This makes it possible to use whole water to be reduced. Alkalized or ionized water system being introduced in the market inevitably separate plus ion water from minus ion water in its process and need to waste acidic water by only using alkalized water for drinking water. *Aquatech ProTechnology* does not separate two but instead reduce oxidation as one water by using high frequency “alternative” current.

Minerals play a role of stabilizing active hydrogen

Oxygen, that as known well, is oxidizing materials in our world, has $+830$ mV in ORP. On the other hand, hydrogen is measured in -420 mV which is very powerful in oxidation reduction. In water contains various minerals and contaminants other than H and O. Those active hydrogen will be absorbed into minerals and stay in them for a while. This “Hydrogen Absorption” is important element for *Aquatech ProTechnology*

and differentiate from other water instruments such as Alkalized water or Ionized water etc.

Alkalized water system produces $-100 \sim -400$ mV ORP water, however, in a moment the number quickly goes up close to oxidation because of hydrogen atoms is very unstable and reactive. Active hydrogen produced by their reduction system goes back to water by reacting with oxygen in water. The reason is simply because several minus ions are separated into acidic water, which are not used for drinking water. Produced water is also ill-balanced in minerals as drinking water. Oxygen makes water tasteful but oxygen ions are plus so it also will be separate into minus acidic side. Direct current used for their system only produces H^+ (plus ion active hydrogen) which is so reactive and unstable to disappear itself very quickly. Even separated minus ion minerals could not absorb much active hydrogen so the ORP jumps up to oxidation level quickly.

Active Hydrogen

Active hydrogen usually could appear in water but disappear very quickly (1/100 seconds) because it is very reactive and unstable. However, hydrogen has two electrons of H^+ and H^- . H^+ with plus electron is very unstable (called free radicals) but H^- with minus electron is rather stable. Usually active hydrogen represents unstable H^+ , but stable H^- can also exist several hours to a few days by being absorbed in minerals. Why does Mineral Redox Water contain this stable H^- ? It is because of high frequency alternative current used for reduction process which stirs water and produces H^- . If we wish to apply active hydrogen to protect our body from oxidation, active hydrogen needs to be absorbed in minerals so it gets easy to be alive in our body as well. Those minerals that had absorbed active hydrogen, after taken into body, go into blood and release active hydrogen. Released H^- that has two electrons in blood will be sent to every part of body cells and reacts to active oxygen (one electron of H^- connected with plus electron of oxygen) to become harmless water. Rest of one electron also functions to clean up blood, kill the cancer cells and so on.

Water, H_2O releases energy by oxidation and save energy by reduction. The lower the ORP, the higher energy water is charged with. This energy can be used to deoxidize, clean up wastes..etc.

Does natural water contain active hydrogen?

Recently study reports that water spring of Tlacote in Mexido contains 10-20 times more active hydrogen than average spring water. This is very unusual as natural water to contain active hydrogen because it could not be produced without high energy. It is still under research and study, but Tlacote spring is surrounded by various volcano that could have been applied to water as a high energy. Of course, the spring contains rich minerals to keep active hydrogen stable. This Tlacote water is called “miracle water” or “healing water” at their local area and many people are visiting there to drink this water since many patients have cured their diseases by drinking this water. (*see website about*

Tlacote water http://www.shareintl.org/archives/healing_water/hw_gfjourney.htm)

Although we have no intention to promote our technology as “miracle water” and Mineral Redox Water is based upon scientifically supported and studied technology, this research result of healing water is interesting enough to potentially verify our technology more effective scientifically in the future. Similar results can be found in waters at following locations in the world. See the website of Nordenau, Germany http://www.shareintl.org/archives/healing_water/hw_mnhealing.htm

Lourdes, France

http://www.shareintl.org/archives/healing_water/hw_bshealing.htm

Nadana, India

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pH in Mineral Redox Water?

Reduced water by *Aquatech ProTechnology* is pH neutral between 6.8 to 7.2. Alkaline water is pH 9.0-12.0 since acidic water is separated. Tasty water from fresh mountain spring is all pH neutral.

What is Mineral Redox Water?

The Revolution of drinking water

Active Hydrogen is an atomic form of Hydrogen with single minus electron. It is very reactive and high-energy atom. It usually stabilize itself by combining plus H atom ($\overset{+}{\text{H}}$) and minus H atom ($\overset{-}{\text{H}}$) as a form of H_2 . Active hydrogen is an atom by dividing those molecules of H_2 . Hydrogen is the first element on the "Periodic Table", colorless, odorless, tasteless and it is highly explosive if reacts with a certain molecules. But it is too reactive and unstable to exist in natural condition. Unless high energy used, single form of hydrogen atoms cannot exist. In regular tap water, only 0.1 ppb/ml or less of this hydrogen atoms exist. **Aquatech ProTechnology** processed water is tested to find it contains over 1 ppb/ml, 10 times more active hydrogen in stable state than tap water. This hydrogen in atomic form is considered to deoxidize and destroy the poison of the cell by neutralizing the active oxygen (to become water) which has been proven to be the cause of various disease. Active oxygen is very active atoms which harm the cells to cause almost 90% of disease.

However, to produce this active hydrogen by water reduction process, it usually requires extremely high energy. That is the reason why it does not much exist in nature world. Only **Aquatech ProTechnology** makes it possible to produce this active hydrogen and stay in water for long period.

What is "Redox"?

Redox is short for Reduction Oxidation. Redox is a measure of a systems capacity to oxidize material. Redox is a classification category of chemical reactions. If oxidation is losing, reduction is gaining. It is losing and gaining of electrons. You may remember from Science classes that the bulk of chemical interactions around us are proton donor/acceptor (sometimes called acid/base) in nature. In reduction-oxidation reactions one chemical species loses, another gains electrons. Redox potential is a value (number) defining how much gaining/losing a system might do; an oxidizing environment (one's we want) has a positive value. Redox is measured indirectly as the ability of an aquatic system to conduct electricity, in millivolts (mV, 1/1000 of a volt), ORP, Oxidation-Reduction Potential. Oxidation-Reduction Potential (ORP) monitoring is normally accomplished by using a platinum measuring electrode. The process exposed to the platinum electrode produces a chemical reaction with the platinum and oxidizes or reduces the platinum band. This process generates a millivolt (mV) signal which is normally of the magnitude of $\pm 2,000$ mV. ORP can change so rapidly that in order to fully benefit if one unstable atom aggressively take or give the other electron fast to become stable.

In a stable condition of electrons, Redox potentials above 400 mV are dangerous to life. Good quality water for drinking is lower than 350mV, and it tastes about the best at 100-200 mV. And water of lower than 100mV is effective for disease healing purpose when the part of body is particularly oxidized (harmed) by disease. **Aquatech ProTechnology** has made it possible to maintain the low millivolt of water ORP.

What is Mineral Redox Water?

Current definition of Oxidation Reduced water in the market is very vague. In true sense, reduced water is supposed to be not only "deoxidized" which is just neutral as natural water but does provide benefit to our body.

What makes then "Mineral Redox Water" so special? Because of various benefits from this water, but importance can be emphasized on existing of "minerals". Mineral

Redox water is produced by high frequency reduction technology. High frequency current of approximately 30-80 KHz causes water to reduce into oxygen and hydrogen in atomic form.

Reduced water should have active electron exchange between atoms, which is measured by so-called ORP, Oxidation Reduction Potential (mV). The more reduced, the lower the number. "Mineral Redox water" regularly shows $-100 \sim -300$ mV (for at least hours and a few days depending on the water condition) and -800 mV at its peak. This measurement is the criteria of power to reduce oxidation of water and bring back the healing power of natural water. Unlike the alkaline water or ionized water in the market that use "direct current", *Aquatech ProTechnology* applies "alternative current" that makes it possible to use whole water to be reduced. Alkalized or ionized water system being introduced in the market so far inevitably separate plus ion water from minus ion water in its process and need to waste acidic water by only using alkalized water for drinking water. And the water shows higher alkaline of over 8 pH. On the other hand, *Aquatech ProTechnology* does not separate two but instead reduce oxidation as one water by using high frequency "alternative" current, and pH remains neutral of 6.8-7.2 pH, which is much closer to natural spring water.

Minerals role of stabilizing active hydrogen

Oxygen, that as known well, is oxidizing materials in our world, has $+830$ mV in ORP. On the other hand, hydrogen is measured in -420 mV which is very powerful in oxidation reduction. Water contains various minerals and contaminants other than H and O. Those active hydrogen will be absorbed into minerals and stay in them for a while. This "Hydrogen Absorption" is important element for *Aquatech ProTechnology* and differentiate from other water instruments such as Alkalized water or Ionized water etc.

Alkalized water system produces $-100 \sim -400$ mV ORP water, however, in a moment the number quickly goes up close to oxidation because of hydrogen atoms is very unstable and reactive. Active hydrogen produced by their reduction system goes back to water by reacting with oxygen in water. The reason is simply because several minus ions are separated into acidic water, which are not used for drinking water. Produced water is also ill-balanced in minerals as drinking water. Oxygen makes water tasteful but oxygen ions are plus so it also will be separate into minus acidic side. Direct current used for their system only produces $\overset{+}{\text{H}}$ (plus ion active hydrogen) which is so reactive and unstable to disappear itself very quickly. Even separated minus ion minerals could not absorb much active hydrogen so the ORP jumps up in ORP measurement very quickly.

What does Active Hydrogen do?

Active hydrogen usually could appear in water but disappear very quickly (1/100 seconds) because it is very reactive and unstable. However, hydrogen has two electrons of $\overset{+}{\text{H}}$ and $\overset{-}{\text{H}}$. $\overset{+}{\text{H}}$ with plus electron is very unstable (called free radicals) for $\overset{-}{\text{H}}$ with minus electron is rather stable. Usually active hydrogen represents unstable $\overset{+}{\text{H}}$, but stable $\overset{-}{\text{H}}$ can also exist several hours to a few days by being absorbed in minerals. Why does Mineral Redox Water contain this stable $\overset{-}{\text{H}}$? It is because of high frequency alternative current used for reduction process which stirs ions in water then produces $\overset{-}{\text{H}}$. If we wish to apply active hydrogen to protect our body from oxidation, active hydrogen needs to be absorbed in minerals so it gets easy to be alive in our body as well. Those

minerals that had absorbed active hydrogen, after taken into body, go into blood and release active hydrogen. Released H^- that has two electrons in blood will be sent to every part of body cells and reacts to active oxygen (one electron of H^- connected with plus electron of oxygen) to become harmless water. Rest of one electron also functions to clean up blood, kill the cancer cells and so on.

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Recent study reports that water spring of Tlacote in Mexido contains 10-20 times more active hydrogen than average spring water. This is very unusual as natural water to contain active hydrogen because it could not be produced without high energy. It is still under research and study, but Tlacote spring is surrounded by various volcano that could have been applied to water as a high energy. Of course, the spring contains rich minerals to absorb active hydrogen stable. This Tlacote water is called “miracle water” or “healing water” at their local area and many people are visiting there to drink this water since many patients have cured their diseases by drinking this water. (*see website about Tlacote water*

http://www.shareintl.org/archives/healing_water/hw_gfjourney.htm) Although we have no intention to promote our technology as “miracle water” since Mineral Redox Water is based upon scientifically proved facts and well-tested technology. However, the research result on the healing water of Tlactoe spring is interesting enough to potentially verify our technology more scientifically in the future for its healing power to our body. Similar results can be found in waters at following locations in the world. See the website of Nordenau, Germany

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Nadana, India

http://www.shareintl.org/archives/healing_water/hw_mag-delhi.htm

pH in Mineral Redox Water?

Reduced water by *Aquatech ProTechnology* is pH neutral between 6.8 to 7.2. Alkaline water is pH 9.0-12.0 since acidic water is separated. As known well, tasty water from freshly scooped from mountain spring all shows pH neutral with rich mineral and oxygen molecules. (Note oxygen is only dangerous when it becomes active oxygen, and certain amount of oxygen in water makes water tasteful.) Some of you might think oxidized water is acidic and reduced water is alkaline. However, oxidation reduction and acidity-alkalinity are two separate things. The pH scale ranges from acidic end of 0 to alkaline end of 14 and 7 as neutral. It is measured of concentrations of H^+ and OH^- ions. **pH**, term indicating the hydrogen ion (positively charged hydrogen atom) concentration of a solution, a measure of the solution's acidity. On the other hand, oxidation reduction is measured by its ion exchange reaction voltage (mV), called “ORP” (Oxidation Reduction Potential). Normally, when pH measures low (acid water), ORP voltage is high and alkaline water shows low voltage. However, “Mineral Redox Water” shows neutral in pH and low mV in ORP voltage. It is rare to find water of this condition, neutral in pH and low ORP voltage except organism water such as urine, saliva, blood plasma, and perspiration. It proves Mineral Redox water is very friendly to our body.

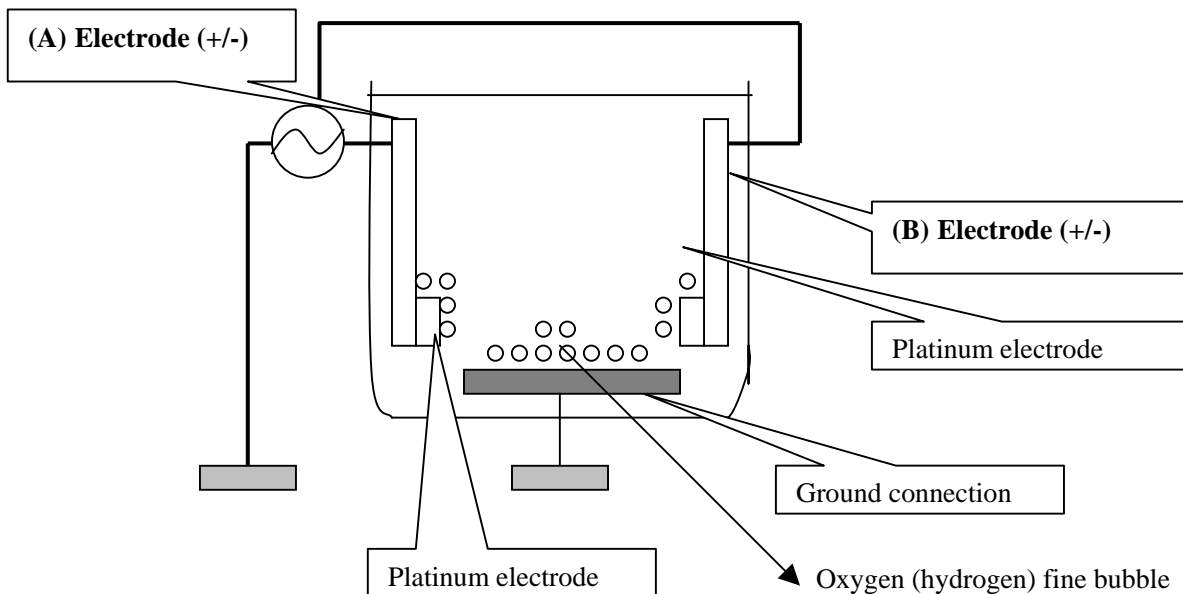
ORP of body measures our life span

ORP can be measured in various products as well as our body. Drinking water, food, and organism water in our body etc. It is interesting enough to find that our disease and ORP are deeply related. For example, ORP measured in urine can show oxidation condition of our body. If our body is oxidized which causes possible disease, urine shows high mV or ORP measurement. Dr. U working at a general hospital in Japan conducted a complete medical checkup with his 871 persons, 92 of normal result (healthy) and 279 of requiring further consultation for their health. He measured ORP of all of their urine. Interesting result was found that many of healthy persons shows ORP voltage of +50 to 74 and persons for further treatment shows +100 to 124. Healthy persons had lower voltage of ORP, less oxidation potential in their body. Persons of exhausted body condition or having cold has higher ORP. It explains that our body gets oxidized when health condition is not well. To maintain ORP in our body low, drinking “Mineral Redox Water” is proven to be effective.

How to make “Mineral Redox Water”?

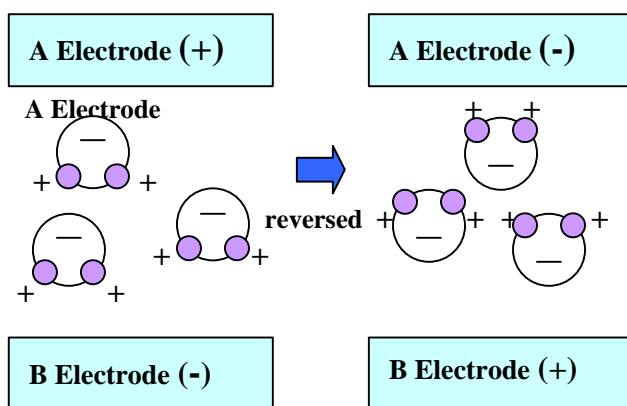
Alkalizing ion water in the market using direct current for water electrolysis separate water to plus ion and minus ion and does dissolved minerals the same. Alkaline water and acid water separation is far different from ideal natural water. Each missing some benefits by focusing on one side benefit, which is mainly producing active hydrogen in water. Natural water contains both plus and minus ions with all good minerals dissolved in it. **Aquatech ProTechnology** has made it possible to create balanced water as close as to natural water using alternative current of high frequency and low voltage.

Drawing is simplified picture to show the system of the appliance.



By using (A), (B) electrodes of alternative current and ground connection electrode, it makes ORP voltage down. There are very few mineral dissolved in tap water so condensed minerals extracted from ocean floor will be added. In a half hour, ORP measures -150 mV, an hour later -300 mV, 3 hours later -600 mV. By adding minerals it makes possible to produce lower ORP water lasting longer time. One of

characteristics of the method is to use alternative current that makes much difference on chemical reaction between molecules. Running alternative current in (A) and (B) electrodes simultaneously, the electrodes switch plus and minus back and forth. Plus electron of hydrogen molecules goes to minus electrode and minus electron of oxygen goes to plus electrode once, but soon electrodes switch them around, the water molecules will be directed the other way. Thus, electrons of water molecules will be electrolyzed by stirring themselves in water. Ground connection itself stays in low voltage. From either (A) or (B) electrode, whichever higher voltage starts electrolyzing molecules to move to lower voltage electrode. Then water molecules stirring themselves to produce active hydrogen. As a result, without separating acid or alkaline water it produces pH neutral reduced water with both plus and minus ions being mixed. This is very important in terms of keeping minus ions in water which works beneficial for health. During stirring process of water, other contaminants and organic matters will be also decomposed and precipitated. At the same time dissolved minerals that was oxidized will be reduced to become easy to be absorbed in our body.



**water molecules electrolyzed
by alternative current**

Rich minerals are the key for good Redox water

To maintain high reduction power in Mineral Redox water, combination of production of active hydrogen and existence of minerals absorbing active hydrogen will be essential. Unfortunately, tap water does not contain much minerals therefore, minerals need to be added. Usage of condensed minerals will be effective for this purpose. Condensed mineral is mineral liquid extracted from the depth of water of Salt Lake city in Utah after removal of excessive salt in water and oxidation reduction process. It contains rich and balanced minerals. Also pure magnesium and pure zinc plates re attached to the electrodes to dissolve both themselves in water during the process. Especially magnesium makes redox more efficient. Minerals help to lower the ORP and absorb active hydrogen. The lower the ORP, the more minerals dissolve themselves in water, and ionized minerals can be absorbed in our body much more smoothly. Minerals that had absorbed active hydrogen in them preserve its reduction energy and at the same time, minerals themselves are reduced to help ORP lower. Minerals function both as necessary nutrients and carrying vehicles of active hydrogen into body. Of course, the volume of minerals will be properly to best benefit our health.

Element	Condensed minerals	Tap water	Element	Condensed minerals	Tap Water
calcium (Ca)		24	copper (Cu)		<0.01
Magnesium (Mg)		4.2	selenium (Se)		<0.05
Zinc (Zn)		<0.01	molybdenum (Mo)		<0.01
sodium (Na)		7.7	nickel (Ni)		<0.01
potassium (K)		0.78	chromium (Cr)		<0.01
manganese (Mn)		<0.01	lithium (Li)		<0.01
Phosphorus (P)		<0.05	cobalt (Co)		<0.01
Iron (Fe)		<0.01	vanadium (V)		<0.01

Comparison of essential 16 elements dissolved in “condensed mineral liquid” and “tap water” (Unit: mg/kg)

Element	Bottled water	Element	Bottled water
calcium (Ca)	0.64~2.4	potassium (K)	0.03~0.26
Magnesium (Mg)	0.15~0.57	sodium (Na)	0.47~1.8

Minerals in bottled mineral water (unit; Mg per 100ml)

Super frequency modulation (FM) Technology

Because of unstable state of hydrogen, certain condition is required for above minerals being able to absorb active hydrogen. Without it, active hydrogen appears on the surface of minerals and soon disappears. In general, hydrogen is supposed to become atomic form under high temperature (300-600°C) and high pressure and absorbed into minerals, then released under low temperature (20-80°C). A quoted example of Telcote spring water matches this condition, however, it would be very difficult to set up this condition. **Aquatech Pro Technology** only has made it possible to produce active hydrogen to be absorbed in minerals under low temperature and low pressure. Minerals will absorb active hydrogen under following conditions; (1) abundant active hydrogen in water (2) pressure of hydrogen is high (3) relatively high temperature (20°C and up) – Those conditions will be set by compression, by our renovative technology, **super frequency modulation technology**. This super FM technology is to provide electrical impact by alternate high and low frequency and create the state of compression in water. This technology increases dramatically alternative current energy of electrolysis without generating thermal energy like direct current, and produces abundant active hydrogen by being stored in minerals.

Super frequency modulation technology has made it possible to produce Mineral Redox water much faster because of its high energy (several 10 times). Distilled water has been believed that electrolyzing is impossible, however, Super FM technology can electrolyze even distilled water from which you can imagine the power of it.

Characteristics of Mineral Redox Water

1. pH neutral of strong oxidation-reduced water

Water of low pH (acid), in general, measures high ORP and high pH (alkaline) low ORP. It is rare to have a neutral in pH with low ORP like the Mineral Redox Water. However, in natural water, acidity of minus ions and alkalinity of plus ions coexist so this mineral redox water can be said an ideal water.

2. low ORP even with rich oxygen molecules

Water under ground usually has less oxygen dissolved to show low ORP. But the Mineral Redox Water produces oxygen as well as hydrogen by alternative current electrolysis, so adequate volume of oxygen is dissolved in the water with low ORP. Oxygen existence is such important to keep water tasteful.

3. the ORP remains low for a long period

When active hydrogen is absorbed in mineral molecules, it will remain for a long period and keep water ORP low. Active hydrogen is so reactive and instable to disappear instantly if you mingle water by a piece of stick or something. ORP will immediately become high plus that allows water to be oxidized easily. However, Mineral Redox water can remain low in ORP from -300mV to -200mV even by mixing water. This is crucially important because long life active hydrogen only can help deoxidizing inside of our body. This function is only created by the alternative current of super high frequency technology developed by *Aquatech Pro*.

4. balanced and reduced minerals are richly dissolved in water

Balanced minerals are important since taking too less or too much of them does not help your health. There are 16 essential mineral elements which human body requires as supplements nutrition to grow and maintain life. On earth 103 mineral elements are confirmed for their existence and 70 among them are confirmed to exist in the human body. We cannot produce those minerals in the body so we need to take them in from food or drink. Minerals vary in their functions as (1) structure materials such as bones (2) physiological function such as iron in red blood corpuscles or iodine of thyroid hormone by connecting themselves with some proteins or fats (3) neural transmission function as ion forms dissolved in body fluid around neural cell membranes. Most of so-called "mineral waters" in bottles in the market only shows 4-5 minerals such as calcium (Ca), magnesium (Mg), potassium (K), and sodium (Na). However, natural water contains much more minerals. It would be very beneficial if you utilize "condensed mineral liquid" we recommend to get with this *Aquatech Pro Water System*.

5. many minus ions exist in water

Unlike alkaline ionized water, water of minus ions is not separated or wasted, Mineral Redox water contains balanced oxygen and carbonic acid. Minus ion is known as a tranquilizer or air purifying function, and it also neutralizes oxidized body cells or deoxidizes in our body. It smoothens the blood stream and cleans up body wastes as well.

6. high permeability

Mineral Redox water's surface tension is very low which means it is less glutinous and highly permeable into body cells. Tap water measures its surface tension $75\sim 80$ dine/cm and Mineral Redox water $50\sim 55$ dine/cm. Its high permeability helps promoting body metabolism. This is the reason why you can drink a high volume of this water adding to its benefit of taste.

7. high energy stored in water

As oxidation releases energy so reduction stores. Mineral Redox water is produced by high frequency current to affect molecules in water to reduce in its oxidation. It means energy is highly charged in water.

What is difference from other treated water?

Buying water is a matter of course in our daily lives. Some survey shows approx. 40% of people in the United States buy water and approx. 30% of them use installed water purifiers. The rates drastically rises up to respectively 60% and 45% in the urban cities. The rates of drinking tap water is as low as 50% average. There are various water purifiers and water treatment appliances in the market, however, clear differences of

benefits and deficits of them are not yet clarified to consumers. We would like to describe differences here of each water in comparison of Mineral Redox Water.

Tap water

During its process of filtration and detoxification for tap water, its molecules and elements are very much oxidized when it is delivered to our home. It is obvious when you measure its ORP in tap water. Oxides used to sterilize and disinfect water can remove toxic substances but could produce another toxic substances simultaneously. One is *Trihalomethanes* that is a chlorine organic compound produced by chemical reaction to other organic compound in natural water. More than 20 similar carcinogenic substance and environmental hormone have been found other than *Trihalomethane*. Mineral Redox water during its process will remove most of chemical toxic substances in water. Water reduction process by alternative current makes those contaminants decomposed, cohered and precipitated out of water. A test records on two waters when *Trihalomethane* mostly increases one minute after boiled in water, and tap water showed *Trihalomethane* of 0.027mg/litre and Mineral Redox water less than 0.001mg/litre. It is proven in experiments that Mineral Redox water decomposes and precipitates dioxin out of water. Anyway, only passed condition as drinking water of tap water is its neutral in pH. This actually gave us strong motivation to develop the *Aquatech Pro Technology* to produce best possible drinking water.

Mineral water

Most of bottled water called “mineral water” is precipitated, filtered, and distilled after drawn from natural sources. The name “mineral water” gives us an impression that it has ample minerals and is good for health, however, that is not always the case. Dissolved minerals differ from the natural sources and some do not have much difference from tap water. Generally speaking, imported mineral water is said to contain more minerals. Its permeability and oxidation reduction potential shows little better than tap water, but it does not maintain much active hydrogen in it. It falls far short to be called good healthy water. It is just not harmful but not beneficial either.

Water purifiers

See [Are we drinking good water?](#)

Water purification system varies on its filtering targets and costs, but is purposing to filter some contaminants, toxic wastes or chlorine from tap water. It helps to remove odors of chlorine to drink water easier. However, most of available purifiers do not remove *Trihalomethane* or some other chemical toxic substances unless you pay very high price. *Trihalomethane* can be volatilized by 20 minutes boiling, but never removed if halfway. Besides, boiled water that is immediately stopped boiling has possibly the most *Trihalomethane*. Either by filtration or distillation, water can be removed of some contaminants as much as of much minerals. And you can not expect improvement of either permeability nor ORP.

Alkaline ionized water

Alkaline water is produced first by filtering tap water to remove some contaminants then by electrolyzing it by direct current using both plus and minus electrodes. And only alkaline water (with plus ions) collected around minus electrode will be used for drinking. Acidic water (with minus ions) collected around plus electrode will not be used for drinking. It needs to be emphasized that this alkaline (ionized) water and Mineral Redox water are two different things.

: One is because of its balance in minerals dissolved in each water. Electrolyzed water by direct current will collect plus ions of calcium (Ca), magnesium (Mg),

potassium (K) and sodium (Na) at the minus electrode. Alkaline water, therefore, contains only those plus ions but wastes all minus ions such as oxygen, chlorine, and carbonic acid which are also essential for human body. Oxygen or chlorine could become harmful only by its chemical reaction. Redox water keeps them beneficial and effectively used for body. For example, chlorine becomes harmful once changed into hypochlorous acid, but chlorine itself is one of essential elements for human life. We need salt in our body, but it is not sodium but chlorine to be used for our needs. Chlorine functions to adjust blood acidity and alkalinity balance, or digestion system. Physiological salt solution is used for intravenous drips because chlorine benefits patients body. Volume of sodium is reduced in its solution. Carbonic acid connected with calcium creates calcium carbonate, structural elements of bones and teeth. It goes without saying that oxygen is essential for our body.

: Second is because of minerals to absorb active hydrogen. Alkaline water does not let minerals absorb active hydrogen so the water cannot store its energy. Alkaline water is sometimes called “Oxidation Reduction Water”, but that is only for very few minutes after the electrolyzing process. If you mingle it with some stick, ORP will jump up and immediately go back to oxidized water. The reason is that only plus ion of active hydrogen is produced by the direct current process which is too active to stay as it is. It could attach itself on surface of minerals but never be absorbed (stored) into minerals.

: Third is because of its pH. Alkaline water shows over 8 pH. Generally, high pH helps lowering ORP, however natural water is very much neutral in pH. Some patients might continue to take alkaline water to treat their particular disease, but ordinary person might have negative effect if continuing for long time.

	Natural water (fresh scoop)	Purified water (bottled water or purifier filtered)	Alkaline ionized water	Mineral Redox water
No toxic substances	○	○*2	○	◎
Mineral balanced	○	△	×	◎
Neutral in pH	◎	◎	×	◎
Permeability	○	×	○	◎
Low ORP	○*1	×	○*3	◎

*1 Only within a few days after scooped from natural sources

*2 Depending upon types of filtration system

*3 Only within a few minutes after the treatment process

Utilizations of the Patented technology

Brief introduction of Patented Electrolyzed Reduction technology:

- 1) US patent number 5435894 since 1995
- 2) Owned by Hideo Hayakawa, Japan
- 3) Description: Process and Apparatus for Improving Quality of Water
 “The invention provides a process and apparatus for improving the quality of water in an easy manner and with reasonable cost and high efficiency. The process provides a grounding electrode and a pair of applying electrodes in water to be treated.

4) Rough sketch of the system on improvement of the water quality:
 Conventional process of water purifier leaves ill-effecting factors in the water unsolved, such as turbidity, smell, amount of dissolved oxygen, chemical oxygen demand (COD), concentration of phosphate and others, which can be improved by this invented Electrolysis system (either of an electric cell or battery or connected to a plug socket through an adapter). It also increases solubility of minerals by decreasing oxidation-reduction potential (ORP) of the water through an electrical treatment which causes no substantial change in pH (it creates the ideal ORP value of the water of 100mV more or less, which riches in ability for dissolving minerals). Concept of increasing “Active-hydrogen” in the water, which was made possible to stay as it is by this invention has been proved by various medical analysis to improve immune system of human body, helping to cure various disease. As “active-oxygen “ also proven as ill-effect on human cells and systems, “active-hydrogen” functions to neutralize “active-oxygen” to become harmless (by combining to become H2O) in human body.

5) Below tables to show results of a test :

Table(1) - improvement per time tested on “contaminated marsh water”

time	ORP(mV)	smell	Visual appearance
untreated	330	Fairly bad	
5 min.	220	detectable	Organic matters are seen by eyesight
10 min.	- 346	Hardly detectable	Deposition of organic and inorganic matters noted
15 min.	- 600	No bad smell	Deposition increased
18 hours after the treatment	- 300	No bad smell	As clear as city water (height of deposition 7mm)

Table(2) – treated water left for 18 hours in the tank

Items	Before	After	Notes
turbidity	25°	2°	Measured by turbidity gauge PC-06, Kyoto Denshi Kogyo
smell	Corrupted algae-like smell	No smell	
Electric conductivity	340 mho/cm	231 mho/cm	Yokogawa, SC82 Type
Oxygen content	9.1 ppm	11.75 ppm	Deposition increased
pH	8.786	7.6	
ORP	300 mV	-300 mV	Toukou Kagaku Kenkyusho, TRX-90 Type
COD	50 ppm	10 ppm	Central Kagaku HC-407
phosphate	0.9 ppm	0.05 ppm	Kyoritsu Kagaku Kenkyusho, F-Type

- 6) Supplemental data: Research report by Dr. Furuya, Department of General Internal Medicine, The Jikei University School of Medicine “Low Oxidation-Reduction Potential Water Repress Dextran Sulfate Sodium Induced Ulcerative Colitis in Rat” shows that Electrolyzed reduced water (ER) combined (more effective with magnesium reduced water) heals effectively ulcer cells. - available
- 7) This patented ER system has been also applied to various fields of business such as food business (not only water but oil), agricultural industry, environmental anti-pollution and so on. – shown on Jap. catalog
- 8) Video of TV show focusing on “ER water” - available