Primer – Atmospheric Hydroxyl Molecule

One term that has been in existence for some time now is the given notation, (·OH /or/ HO·) hydroxyl molecule. Medical personnel, scientists, atmospheric researchers, chemists, wastewater engineers familiar with the 'Fenton Reaction', cosmologists are all familiar with this terminology and will work on a day to day level with this molecule.

Your contact with Odorox® technology has brought this seemingly 'new' terminology into your every day usage. Therefore questions would be a normal response. What we all took for granted as 'fresh air' can now be described as chemical notations.

NASA has conducted years of research into atmospheric hydroxyls. You may be surprised to know that in an outdoor ambient cubic centimeter there would be a natural variance of 500,000 – 2,600,000 hydroxyls. When clouds are present, that concentration will jump by 20 %. Therefore the neutralizing and cleansing effect of atmospheric hydroxyls are vital to our continued existence. Simply stated, life on Earth would not be possible without the activity of atmospheric hydroxyls.

Impacts of Tropospheric chemistry

The chemical percentages shown in the chart below reveals percentages of atmospheric gas composition. The atmospheric reaction with ·OH molecule dominates the removal of most emitted airborne pollutants. Interaction between hydroxyls and V.O.C's will determine their lifetime and abundance. Tropospheric ·OH levels thus regulate the self-cleansing ability or oxidizing (reduction chemistry) capacity, of the atmosphere and controls the levels of greenhouse gases such as CH_4. (Note: CH_4 is the second most significant greenhouse gas after CO_2)

The current cause of apprehension among atmospheric scientists is that the finite number of hydroxyls will eventually be quenched by the ever increasing volume of pollutants emitted into our atmosphere. The lower number hydroxyl count (500,000 cu^3) was an average found above polluted cities. The greater number hydroxyl count (2,600,000 cu^3) was found above natural green belts. It is interesting to note that there is no hydroxyl activity inside closed buildings. It can be said that the current state of poor indoor air quality is the result of the absence of naturally occurring atmospheric hydroxyls within the building envelope.

Is it possible to overproduce Hydroxyls?

Hydroxyl formation cannot exceed the available number of Hydrogen atoms in the atmosphere.

- That 'Available' number is – 0.00005 % of Total Atmospheric Gasses
- Water Vapor – is 0 – 4 % of Total Atmospheric Gasses

It would be impossible to produce more than the sum total of available hydrogen or the sum total of Water Vapor. Digital readings show that the Odorox® process converts between 10 – 14 % of the available water vapor molecule into the valuable hydroxyl molecule (·OH). In practice we are using a fraction of a fraction to produce the needed end result, the ·OH molecule.

Gas Name	Chemical Formula	Percent Volume
Nitrogen	**N2**	**78.08%**
Oxygen	**O2**	**20.95%**
***Water**	**H2O**	**0 to 4%**
Argon	**Ar**	**0.93%**
***Carbon Dioxide**	**CO2**	**0.0360%**
Neon	**Ne**	**0.0018%**
Helium	**He**	**0.0005%**
***Methane**	**CH4**	**0.00017%**
Hydrogen	**H2**	**0.00005%**
***Nitrous Oxide**	**N2O**	**0.00003%**
***Ozone**	**O3**	**0.000004%**

*** Variable gases**

Citation: Pidwirny, M. (2006). "Atmospheric Composition". *Fundamentals of Physical Geography, 2nd Edition*. Date Viewed. http://www.physicalgeography.net/fundamentals/7a.html

What type of Hydroxyl does Odorox® products produce?

As a base of understanding, there are four basic types of hydroxyls.

1. **Interstellar**
2. **Atmospheric / Tropospheric**
3. **Biological**
4. **Chemical**

Three of these we DO NOT produce. They are the Interstellar, for obvious reasons. Then there is the Biological (In Vivo - in body, cellular type). Lastly is the chemical sort.

Atmospheric hydroxyls do NOT pass across the exterior human cellular barrier. Biological hydroxyls are ONLY produced in response to invaders that the bodies' natural defenses cannot normally address. The cellular etiology is as follows. The foreign cell/pathogen is examined by the bodies' immune defense system and then an attempt to neutralize the invader is initiated. Should this primary effort fail, other protocols are brought to bare, such as enveloping the invader and then creating and injecting the invader with H_2O_2 (Hydrogen Peroxide). In the unlikely event that this protocol should fail, the last line of defense is brought to bare. Electrons will be 'scavenged' by certain cells from either Iron or Copper. From this activity the biological ·OH (Hydroxyl) molecule is produced. The sole purpose of which is to destroy the life threatening pathogen.

This biological hydroxyl will destroy only THAT cell's DNA and therefore, its ability to replicate. The result? We continue to live. ONLY aberrant cells are affected in this manner, normal cellular structure is NOT attacked. ONLY selective pathogenic cells are targeted. At present there are several American laboratories that are seeking to produce a 'Chemical Hydroxyl', the purpose of which, is to inject that molecular agent into a tumor and therefore have the mass neutralized. Again, this biological (In Vivo) hydroxyl is not produced by the Odorox® process.

As a point of reference, the 3M Corporation has been granted a 'Medical Patent' to produce a hydroxyl based atmospheric delivery system (inhaler) for asthmatics. Long years and millions of research dollars were put to work so that this 'safe and effective' formulation could be provided for public use. It follows that, if this delivery/medication system were flawed, in any way, it could NOT be released to the general public. Asthmatics struggle daily with formidable respiratory challenges.

Could we now imagine that the FDA would sanction a product that would further burden their respiratory system? Of course not. Medical patents were granted first in Great Britain and then in the United States. Incidentally, those who use the 3M Puffer are amazed at how well it works. They acknowledge that this technology is quite a leap forward from current medication delivery systems.

The 3M chemical equation can be provided for your examination. (See Proventil HFA). Please note that hydroxyls provide nearly half the molecular weight of the patented formulation.

Now, onto the type of hydroxyl that we produce Atmospheric:

Did you know that it is the action of 'Atmospheric Hydroxyls' that keeps the air that we ALL breathe safe?

Outdoor, daylight concentrations of "atmospheric" hydroxyls are $2X10^6$ cm^3. That figure equates to trillions within the size of a sugar cube. It is in fact the 'ABSENCE' of hydroxyls' within our homes and work places that cause 'Sick Building Syndrome' and 'Building Related Illness' (BRI).

In the early 1970s', Leeds University of Great Britain, embarked on a program that asked the question, "What do hydroxyls do?" The University study found that, the activity of atmospheric hydroxyls was responsible for neutralizing some 2500 atmospheric chemicals by way of some 7000 reactions.

The challenge was, how does one produce or generate atmospheric hydroxyls? Several prestigious corporations and universities have tried and failed. The Odorox® process proved successful and therefore American and Canadian patents were filed. This technology has proved successful the world over. Odorox® hydroxyl generators have been running safely and effectively for over 10 years now. Current laboratory reports are available that unequivocally show the efficacy of the generation of hydroxyls. These test reports bare out the fact that, for the first time, a device could safely and effectively outperform chemicals, foams, sprays and misters. History was made.

Generally speaking, people love to live in sunshine. When it comes to our preferred vacation destinations, we tend to put forth no small effort to seek it out. So wherever sun meets moisture, you will find an abundance of vibrant life, while shadow and darkness breed bacteria and disease.

The absence of sunlight in our lives causes depressive disorders such as Seasonal Affective Disorder (S.A.D.). We thrive in sunlight; virus, bacteria and molds do not. This remarkable product, that has been designed, engineered and built by HGI Industries Inc., which carries the distinctive Odorox® brand name, reflects this innovation in 'Green technology'. It is therefore and rightly referred as: “Green Technology at Work®”. No harmful chemicals, no residue, no offensive odors. Therefore, we flourish, pathogens do not.

Our commitment to continuous field and laboratory testing shows that the technology is both safe and effective. To that effect we have engaged the most stringent air quality testing laboratory in the nation to verify the that there are NO adverse chemicals in our discharge air flow, nothing that could harm the very young nor the severely health challenged. The Odorox® hydroxyl generator passed with flying colors.

It has been our corporate experience that informed clients expect nothing less than reliable technical expertise with a high aptitude for both site specific engineering knowledge and hands-on experience from their consultant. We are experienced and knowledge-based, trained professionals. Our technology is currently being requested from clients ranging from other engineering professionals to liability insurers, military, livestock husbandry and the medical profession.

At HGI Industries Inc. we provide comprehensive and field-proven engineering expertise, technical advice and complete aerobiological project management of field and plant operations. This decade long resource of expertise has led us to expand from our large commercial projects to include portable hydroxyl processors that are easily manageable for hospital/extended care, restoration/remediation and home use.

All Odorox® hydroxyl generating systems are certified. ETL US/Canada - CSA & UL Standards

