White Paper on DIOXYTETRAHYDRIDE GAS

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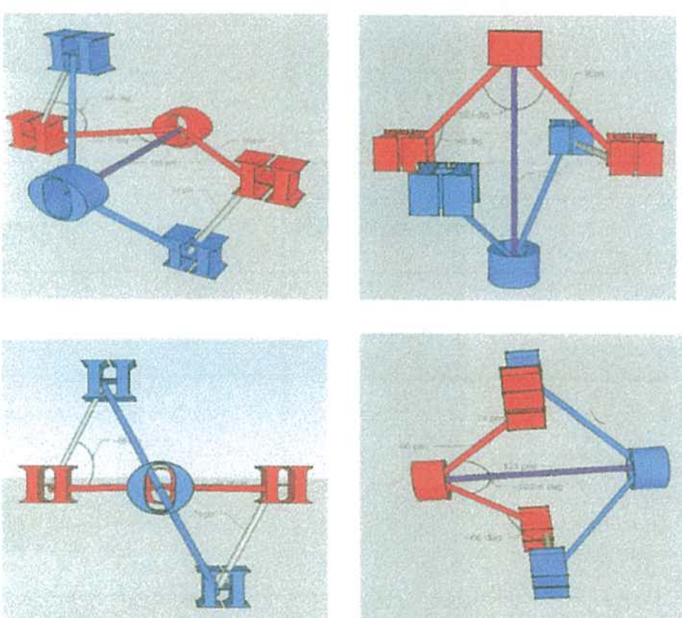
Introduction

Dioxytetrahydride Gas (a.k.a., SG Gas) is an electron-rich gaseous form of water not created by electrolysis, but rather by creating an electron rich environment with a targeted, energy efficient process that provides a reaction zone for the above said Gas to form. (Verification of this statement is provided in Completed test #1 listed in the next section).

Dioxytetrahydride Gas is created when very strong, targeted electromagnetic fields are applied to liquid water in the presence of an electrochemical solution.

The electromagnetic energy provided above is sufficient to promote formation of diatomic oxygen from two water molecules. The arrangement of the remaining hydrogen from the same water molecules is also impacted by the above said process. These same excess electrons provide the targeted energy to overcome the normal H-O-H water geometry and allow a larger, yet stable arrangement of hydrogen and oxygen to form, (ie: H_4O_2). The same electron rich environment promotes hydride character of the hydrogen portion of this new structure and allows its bond angle to be altered between the hydrogen and oxygen, (from 104° to 118°). In addition, the same hydride character of the hydrogen portion in this new arrangement provides the stability for its new geometry, inhibits "proton like" clustering, and helps maintain a stable autonomous, independent H_4O_2 liquid-gas structure that we call a "Dioxytetrahydride".

Figure 1 – One Possible Structure of Dioxytetrahydride



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It is known that the "positive" charge density of Hydrogen protons, (H^+) is $2X10^{10}$ times that of sodium, and that H^+ hydrates and bonds quickly in water with whatever it can, at first opportunity.

When H^+ ions are dissolved in pure water, their positive charge density will enable them to form stable protonated clusters of $(H_x\text{-}O_y)^+$. These protonated clusters are well documented in the primary chemical literature, Zundel Cation (H_5O_2), Eigen Cation, (H_9O_4), etc.

In generating Dioxytetrahydride Gas, there are no appreciable Hydrogen Cations (H^+) or Anions (H-) formed in the completed reaction. However, the provision of an electron rich environment promotes the hydride behavior in the hydrogen portion of the (H_4O_2) structure. It is this hydride effect that prevents conventional ionization, and inhibits the Dioxytetrahydride molecules from clustering like the H^+ proton. In other words, the electrons repel other available water molecules and this in turn, allows enough stability for the (H_4O_2) to form, (not cluster), and exist in an autonomous, stable, water-liquid gas, (H_4O_2), independent molecular structure known as Dioxytetrahydride Gas.

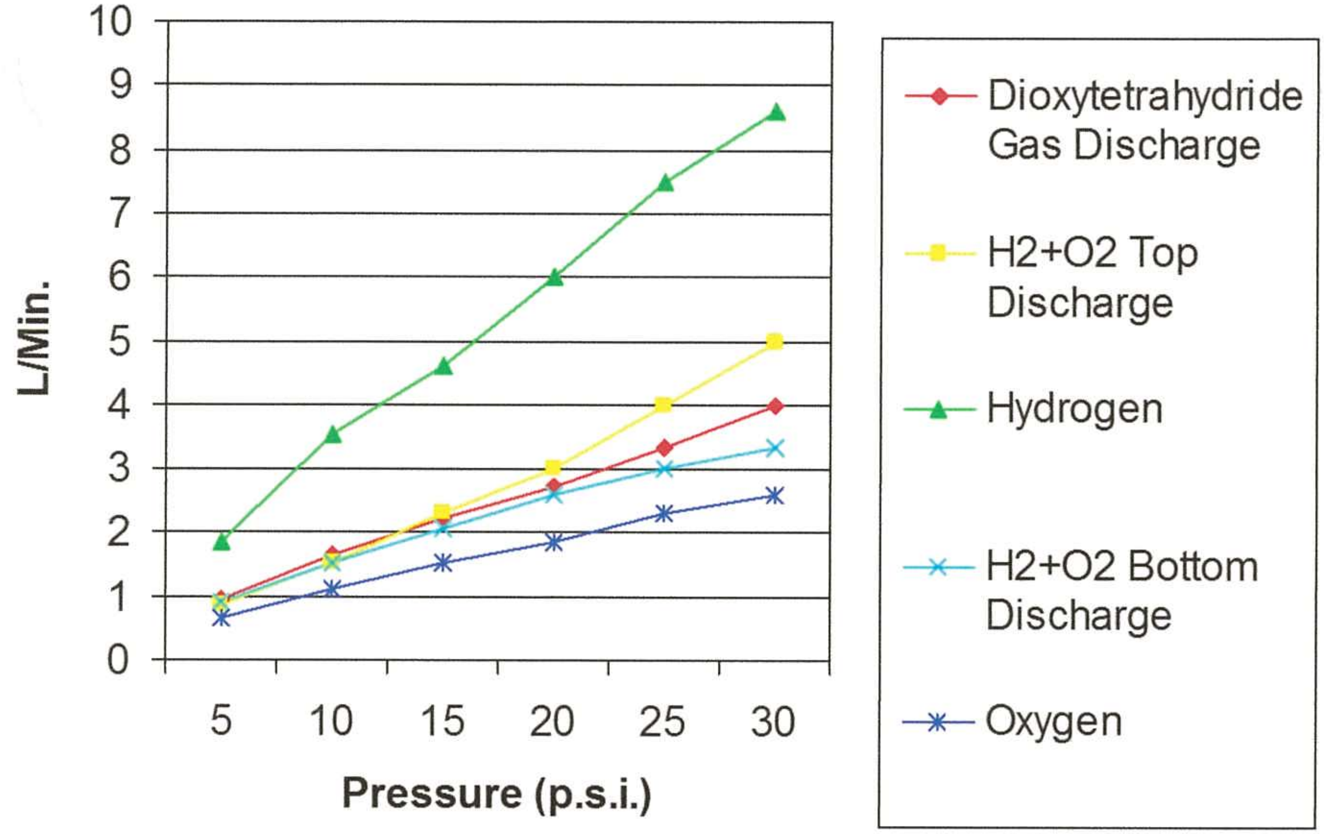
It is the addition and surplus of electrons that repel water molecules to create the Dioxytetrahydride Gas and not the breaking of either hydrogen or oxygen bonds like that which occurs in classic electrolytic wet chemistry. This absence of bond breaking explains how such a low amount of energy is used to convert liquid water into gas with this process.

Completed Tests on Dioxytetradydride Gas

1. Oxidation Reduction Potential (ORP) testing of pure water saturated with Dioxytetrahydride Gas in it, (ORP results before and after "sparging" with Nitrogen gas):
   - Duplicate nitrogen sparge tests were performed on duplicate samples from the same aliquot of above said pure water saturated with Dioxytetrahydride Gas (or Dioxytetrahydride Gas-saturated solution).
   - Before ORP's were measured at 379 mV and 380 mV respectively
   - 10 minute continuous sparge, the ORPs were measured at 345 mV and 342 mV respectively.
   - A 9%-10% drop in ORP was explained from the effect of the plastic sparger tube surface material immersed in and connected to the fish tank stone sparger consuming some of the ORP.
   - **Conclusion: If the Dioxytetrahydride Gas was ionized hydrogen and/or oxygen, then the amounts of these ions would have been measured much higher in solution before sparging, and the ORP would have changed notably as soon as the nitrogen gas was allowed to sparge into in the solution.**

2. Gas Flow Rates:
   - Hydrogen flow rate through a membrane is faster than that of oxygen.
   - Dioxytetrahydride Gas has a unique flow rate faster than that of oxygen but slower than hydrogen.
   - Dioxytetrahydride Gas compressed in a Cornelius Keg has the same flow rate at the top and bottom of the tank, indicating that the hydrogen and oxygen are in a bonded form.

Figure 2
Reverse Osmosis Membrane Measurements



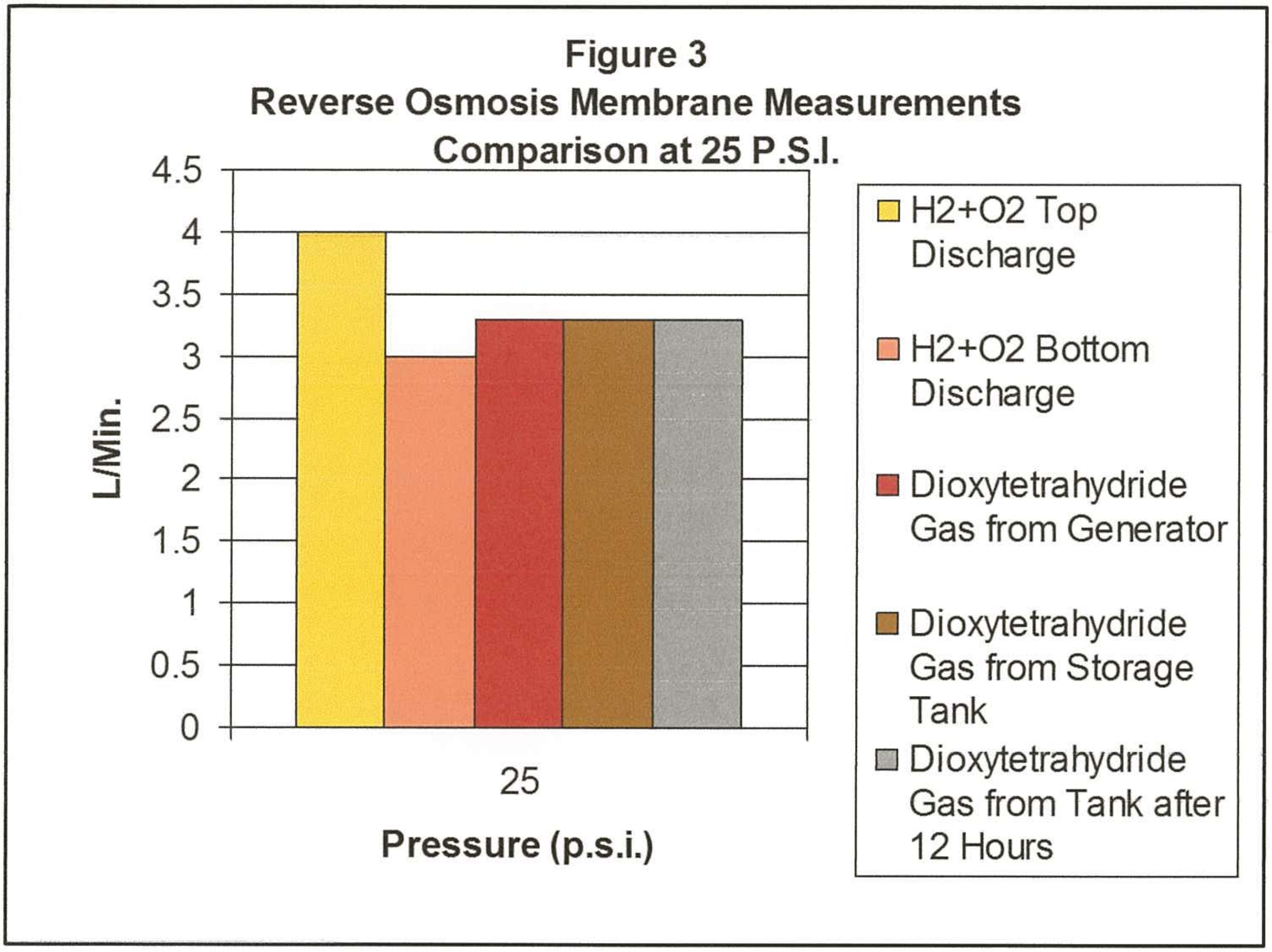
Hydrogen and oxygen compressed in a Cornelius Keg at a 2 – Hydrogen to 1 – Oxygen ratio had hydrogen flow off the top of the tank and oxygen flow off the bottom of the tank, indicating that hydrogen and oxygen do not mix and are joined only through a reaction.

Additional Notes: Reverse Osmosis Membrane Measurements Average(*) Flow Rates (L/Min.) at 5-30 p.s.i. Pressures

(*) Average of 2 or more repetitive determinations.

Mixture of H_2 (30 p.s.i.) and O_2 (15 p.s.i.).

Dioxytetrahydride Gas measurements directly from generator.



Notes: Flow rates (L/Min.) for Dioxytetrahydride Gas and a mixture of hydrogen and oxygen (30 and 15 p.s.i., respectively) at 25 p.s.i. pressure.

3. BTU Efficiency of Dioxytetrahydride Gas

- Copper tube is filled with 100 grams of water.
- Flow rate of hydrogen and oxygen is set at 2:1 mix flow rate.
- Same flow rate used for Dioxytetrahydride Gas.
- Each gas is ignited to flame and used to heat copper tube to 100° F.
- Dioxytetrahydride Gas flame heated in approximately one-half time of that of hydrogen and oxygen.
- Other visual and audible differences are the hydrogen/oxygen flame is noisier and flame color is yellowish compared with that of the transparent bluish flame of Dioxytetrahydride Gas.

- Explanation of visual and audible difference: Since hydrogen and oxygen do not mix, the "raspy" sound of the flame is caused by the loss of some of the hydrogen escaping into the air. This results in an "oxidative" flame thereby reducing flame temperature and yellowish flame. Conversely, Dioxytetrahydride Gas blue-colored flame is quiet.

4. Hydrogen Fuel Cell:

- Hydrogen produced from distilled water produced one watt of energy to run a one-watt fuel cell.
- Hydrogen produced from Dioxytetrahydride Gas-infused water produced two watts of energy to run a one-watt fuel cell.
- Combination of hydrogen and oxygen does not run a one-watt fuel cell.
- Dioxytetrahydride Gas does run a one-watt fuel cell.
- Explanation: The only way a one-watt fuel cell could produce two watts is because the hydrogen are carrying 2 electrons. The same is true when Dioxytetrahydride Gas is directly applied to the fuel cell.

5. Permeability:

- Distilled water is placed on a ceramic filter disc and water beads up on the surface of the disc.
- Dioxytetrahydride Gas-infused water is placed on a ceramic filter disc and will permeate through the disc.
- Observation: the surface tension of Dioxytetrahydride Gas-infused water is less when compared to regular water.

6. GVD Camera:

- Droplets of many types of water were suspended and energy measurements were taken using a GVD Camera (see enclosed charts). One type of water tested was the water infused with Brown's Gas or gas produced from electrolysis (named "Sparks").
- GVD Camera tests of Dioxytetrahydride Gas-infused water (named "Watt-Ahh") showed approximately a sixteen standard deviation difference compared to that of other types of water. Similar results occurred using a GVD Camera on Dioxytetrahydride Gas-infused water that was produced at least seven years prior to testing.
- Results of the Dioxytetrahydride Gas-infused water showed a very high level of energetic activity and stability.

7. Welding or Fusing of Ceramics:

- The use of either hydrogen and oxygen or Brown's Gas in a flame applied to ceramic will create a hole but not create a molten puddle of ceramic.
- Dioxytetrahydride Gas flame applied to ceramic (oxidized material) does create a molten puddle to enable welding (or repair) of ceramic.

8. Water to Gas Expansion

- One liter of water will produce 1,800 liters of Dioxytetrahydride Gas @ ambient pressure and also at room temperature (77°).
- Dioxytetrahydride Gas has a density of 0.556. A balloon filled with Dioxytetrahydride Gas will lift the balloon.
- Dioxytetrahydride Gas flows through liquid nitrogen with no effect (no freezing). A balloon filled with Dioxytetrahydride Gas will not collapse when placed in a freezer overnight.

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9. Plant Growth Rates:

- Plant growth is 15 to 30% faster when water infused with Dioxytetrahydride Gas is used compared to that of tap water (see Figure 4 below).
- Other visible differences of plants watered with Dioxytetrahydride Gas-infused water: leaves are darker green and larger in size (also buds)
- Nutritional differences of plants watered with Dioxytetrahydride Gas-infused water: higher percentage of digestible proteins and carbohydrates (see Figure 4 below).
- Plants, like humans, run on electrons. Greater uptake of electrons by cells supports more efficient growth.

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Figure 4 – Comparison of Barley Grown with Dioxytetrahydride Gas-infused Water ("Watt-Ahh") vs. Tap Water

University of Georgia, UGA Extension Results, Dated May 9, 2014 – Comparison of Dixoytetrahydride Gas-infused Water ("Watt-Ahh Water") with Tap Water

- 65% higher crude protein compared with that of Tap Water
- 77% higher digestible energy
- 80% higher carbohydrates
- 94% higher digestible fiber

10. Lower Water Purification Cost:

One 80-cell machine can polarize over 60,000 gallons of pure water in a 24-hour period (or 10 batches of 6,000 gallons). The cost for polarization is very economical, involving only electricity to operate the machine, and approximately a total of 8 gallons of liquid water over a consecutive 24-hour period (at a rate of one Liter of liquid water converting to 1,800 Liters of gas @ ambient pressure and at room temperature (77° F.).

The gas can be used for pre-treatment of incoming water that lowers energy costs (approximately 30% as shown in Figure 5 below) and extends the life of expensive reverse osmosis membranes. More efficient water purification (greater percent recovery of permeate) also provides the benefit of greater water conservation which is an on-going challenge for any beverage manufacturer particularly craft beer being produced in drought-prone areas. *(Excerpt from Rob Gourley's article published in Beverage Industry, June 2017,* http://www.bevindustry.com/articles/90283-can-electrons-lower-a-beverage-makers-energy-costs

Figure 5-Comparison of Electron Pretreatment of Brackish Water vs. Thin Film Composite (TFC) Reverse Osmosis Membrane

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Pre-treatment Alternatives	Na (Sodium) Raw / RO Treated mg/L	Na % Reduction	Cl (Chloride) Raw / RO Treated mg/L	Cl % Reduction	Trans Membrane Pressure
Electron Treatment *	29,800 / 24.9	99.91	4,120 / 38.0	99.08	30 psi
Typical TFC Membrane	29,800 / 9,834	67	4,120 / 1,359.6	67	120 psi

Improved membrane salt rejection by 30%, increased permeate flow, while lowering the trans membrane pressures by 4 times.

11. Human and Animal Wound Healing:

- Hydrating topical wounds with Dioxytetrahydride-infused water supports the body's intrinsic healing processes. Wounds can be difficult to heal such as bed sores. Medical practitioners and their patients have observed healing within a week or less by hydrating the wounds with Dioxytetrahydride Gas-infused water.
- Dioxytetrahydride Gas-infused water detoxifies wounds such as those caused by Brown Recluse Spider bites, and supports healing and reduction of scarring.

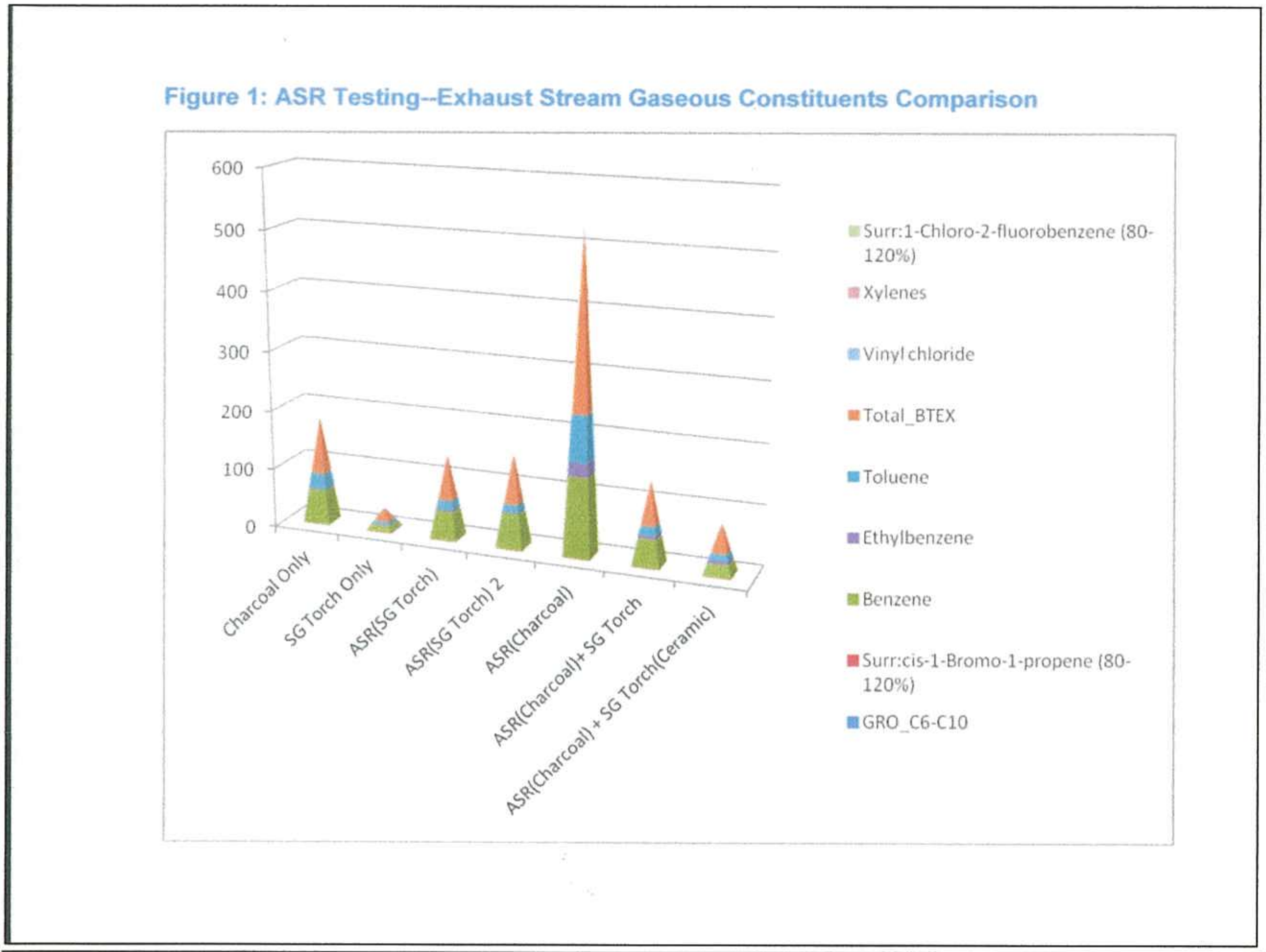
- There is no pain from major topical burns as long as the wound is kept submerged (or hydrated) with Dioxytetrahydride Gas-infused water.
- Dioxytetrahydride Gas-infused water will support healing in areas of limited blood flow such as wounds to horses' hocks.
- Medical practitioners observe regeneration of retinas when Dioxytetrahydride Gas-infused water is applied to the eyes. A preliminary clinic trial showed some regeneration of kidney function when patients drank Dioxytetrahydride Gas-infused water.
- Explanation: Dioxytetrahydride Gas-infused water seems to improve cell-to-cell communication and cell-to-brain communication. The water appears to increase the redox signal to bring stem cells and T-cells to wound sites. It may be stabilizing hydrogen peroxide produced by certain T-cells longer at wound sites. The water also will aid in the detoxification of cells and tissue.
- Breathing of Dioxytetrahydride Gas, using a nasal cannel, will reduce adverse symptoms associated with inflammation in the lungs and other respiratory conditions.
- Breathing of Dioxytetrahydride Gas, using a nasal cannel, appears to bring endocrine gland functions back to normal (e.g., better sleeping and less anxiety). This therapy could assist in providing better clarity and calming of the brain for those suffering from Post-traumatic Stress Disorder or PTSD.
- Breathing of Dioxytetrahydride Gas, using a nasal cannel, after post-surgery, may reverse the adverse secondary effects of anesthesia.
- Explanation: Dioxytetrahydride Gas may be restoring the electron and proton balance in the Myelin Sheath of neurons – full report entitled "WIT Report on Neurological Support" can be found under WIT Technology Updates (http://www.wateriontechnologies.com/NewsLetter/Newsletter.aspx), dated 10/3/2016.

12. Vitamin and Mineral Absorption:

- University of Florida (Gainesville, FL.) studied the rate of transfer of vitamins (Vitamin C and iron) across intestinal cells and amount of absorption into the blood stream (a copy of the full study is available upon request). When compared to that of campus tap water, Dioxytetrahydride Gas-infused water (named "Watt-Ahh") showed approximately 500% and 800% higher volume for Vitamin C and iron, respectively.

13. Efficient Burn of Toxic Material:

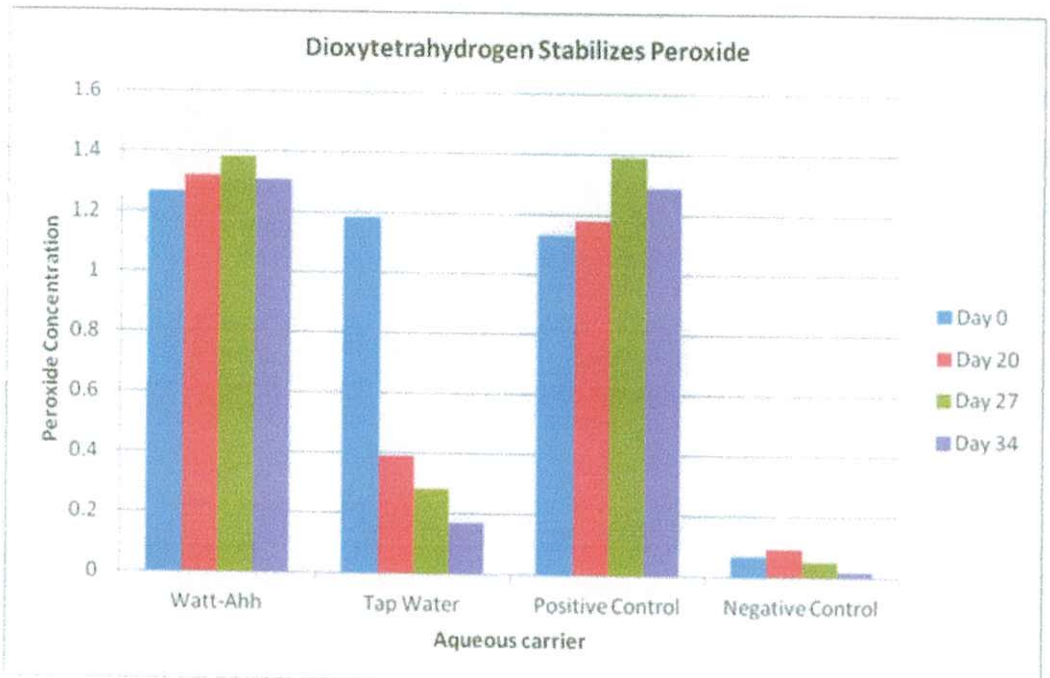
- Source: Support information contained in an expert affidavit filed with patent.



14. Stabilization of Peroxides and Chlorides:

- Dioxytetrahydride Gas-infused water stabilizes unstable compounds (e.g., hydrogen peroxide) in neutral pH of water.

Figure 6 – Dioxytetrahydride Stability of Peroxide (Source: Walter Leise PhD., owner of Sarasota Medical Products, Inc.)



Walt

S·M·P
Sarasota Medical Products, inc

- Chloride Stability (Source: Walter Leise PhD., owner of Sarasota Medical Products, Inc.)
    - A series of dilutions were set up and aged for 75 days at 50C, or approximately two years of stability of this solution that creates chlorine dioxide.
    - A solution of chlorine dioxide at a concentration of 0.4 ppm was separately added to dioxytetrahydride gas-infused water and tap water.
    - The samples were aged for 75 days at 50C. Prior to testing the concentration of chlorine dioxide of each sample, a positive control of chlorine dioxide at a concentration of 0.4 ppm in water was prepared.
    - The concentration of chlorine dioxide measured in the two samples after aging, was 0.4 ppm for the dioxytetrahydride gas-infused water and 0.2 ppm for tap water.
    - The same protocol was performed on 0.2 ppm concentration of chlorine dioxide and the test results was 0.2 ppm for the dioxytetrahydride gas-infused water and 0.0 ppm in tap water.
    - The dioxytetrahydride gas-infused water was found to preserve chlorine dioxide at levels seen when chlorine dioxide in solution is freshly prepared.

Figure 7 – Dioxytetrahydride Stability of Chlorine Dioxide

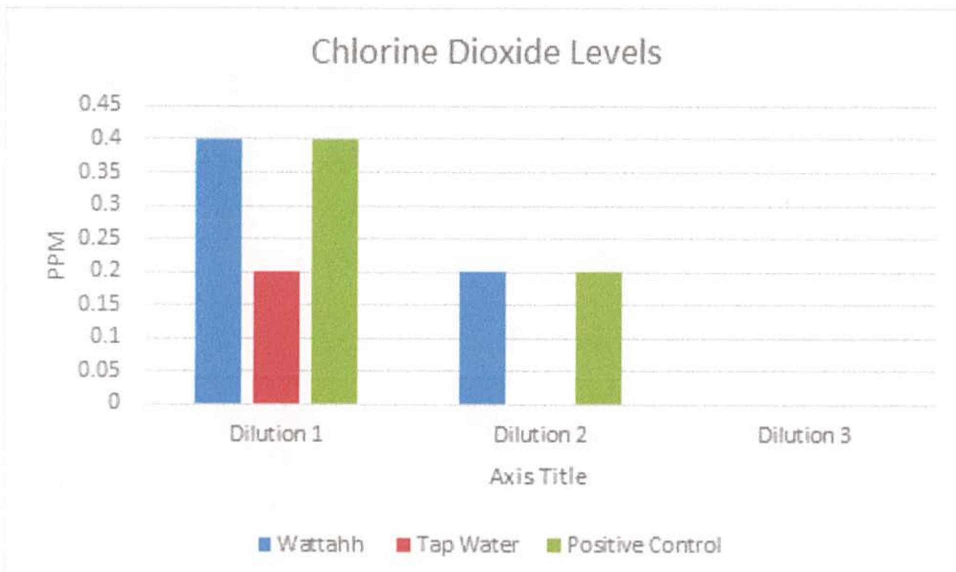


Figure 7 – Dioxytetrahydride Stability of Chlorine Dioxide (cont.)

	Chlorine Dioxide Levels PPM		
	Aged 75 days @50C		Made fresh prior to test
	Watt-Ahh	Tap Water	Positive Control
Dilution 1	0.4	0.2	0.4
Dilution 2	0.2	0	0.2
Dilution 3	0	0	0

Sum	**1.581e+005**	**2583**	**68.07**	**9744**
Min	**5187**	**84.35**	**2.028**	**289.1**
Max	**5445**	**87.58**	**2.485**	**355.9**
Mean	**5271**	**86.09**	**2.269**	**324.8**
RMS	**66.39**	**0.8818**	**0.107**	**15.81**
Median	**5262**	**86.14**	**2.271**	**325.4**
25 percentile	**5223**	**85.48**	**2.207**	**315.7**
75 percentile	**5292**	**86.92**	**2.32**	**335.5**
Skewness	**1.157**	**-0.0769**	**-0.09553**	**-0.1845**
Excess	**1.074**	**-0.9717**	**0.1182**	**-0.1657**
Confidence interval	**23.76**	**0.3156**	**0.03828**	**5.66**
Entropy	**1.992**	**2.24**	**2.095**	**2.066**
Fractality	**1.837**	**1.603**	**2.015**	**1.998**
Fractality RMS	**0.1236**	**0.1159**	**0.1129**	**0.1149**

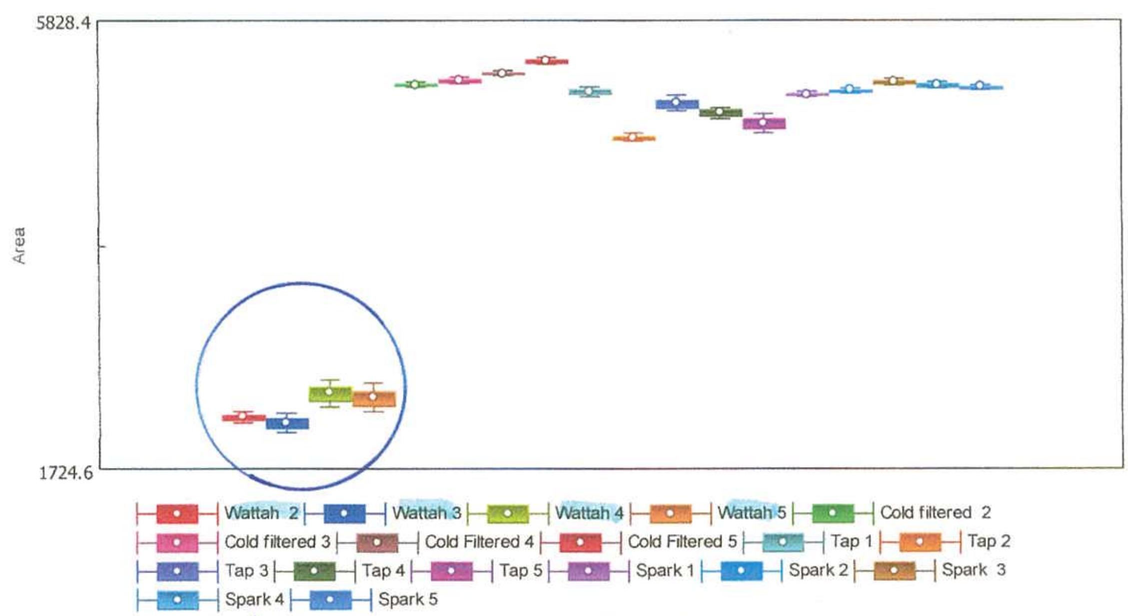
The results of statistical comparison

Statistical comparison of 18 independent samples performed. Used parametric test: ANOVA one way test

ANOVA one way test

Area

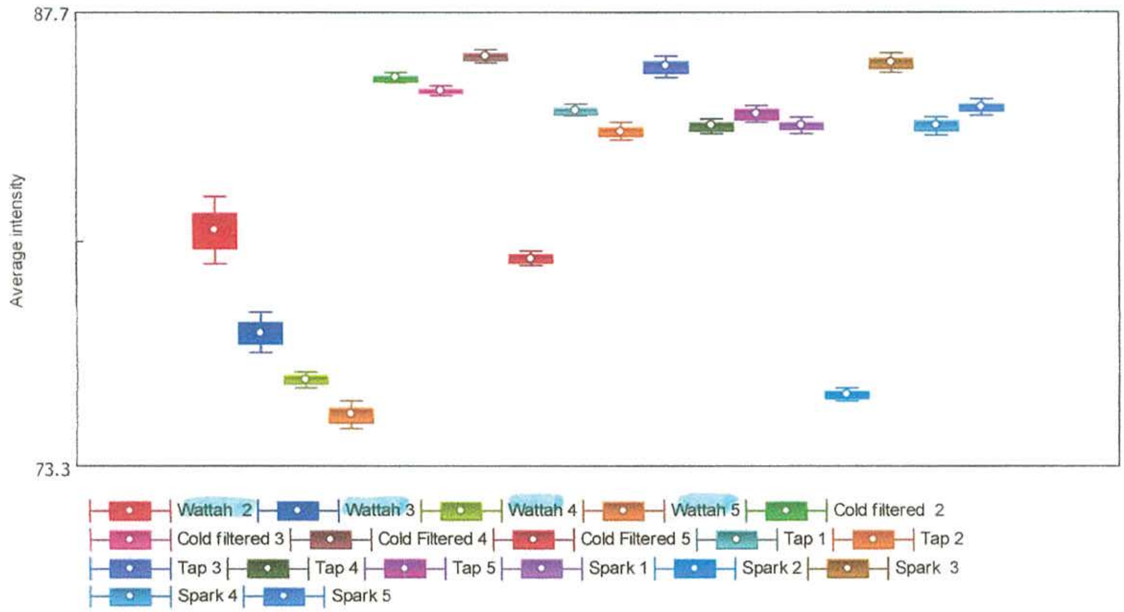
By ANOVA one way test samples are statistically dissimilar; p = 0



→ Spark is infused with Brown's Gas

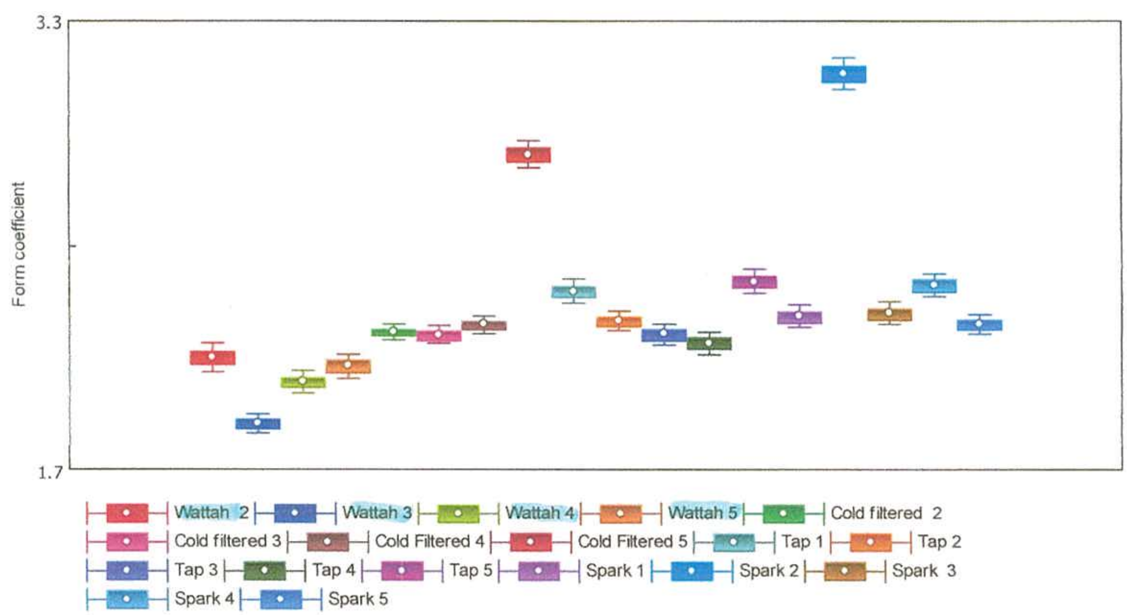
Average intensity

By ANOVA one way test samples are statistically dissimilar; p = 0



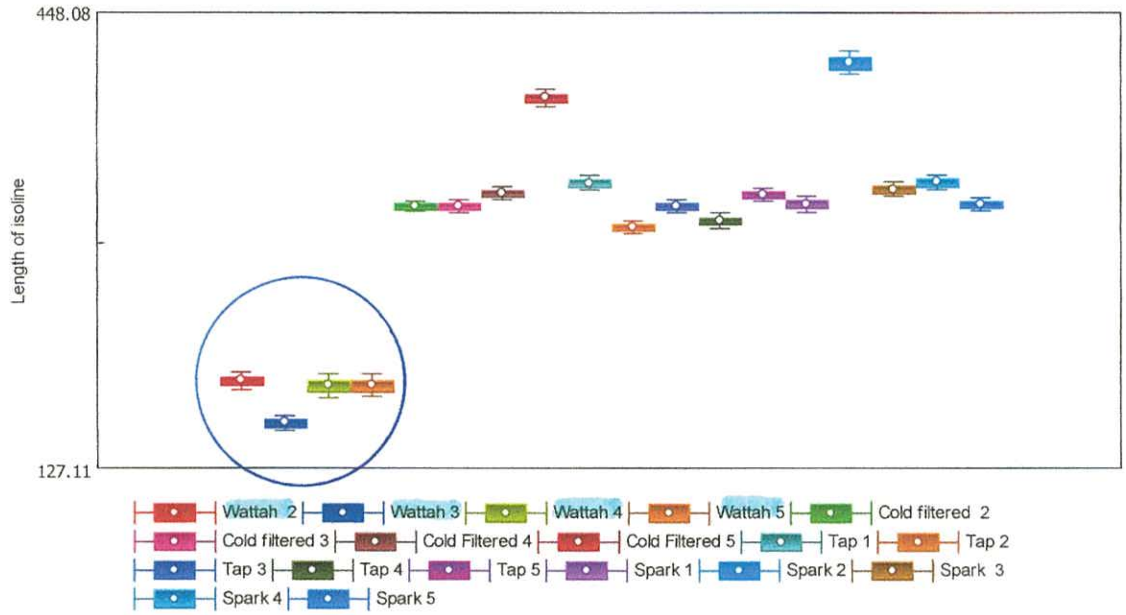
Form coefficient

By ANOVA one way test samples are statistically dissimilar; p = 0



Length of isoline

By ANOVA one way test samples are statistically dissimilar; p = 0



	Area	Average intensity	Form coefficient	Length of isoline
RankOfSample1	**1525**	**5500**	**4829**	**2204**
RankOfSample2	**1280**	**3053**	**827**	**849**
RankOfSample3	**2292**	**1978**	**2507**	**2081**
RankOfSample4	**2164**	**1031**	**3910**	**2126**
RankOfSample5	**1.124e+004**	**1.317e+004**	**7114**	**8358**
RankOfSample6	**1.253e+004**	**1.193e+004**	**6936**	**8560**
RankOfSample7	**1.4e+004**	**1.461e+004**	**7988**	**1.021e+004**
RankOfSample8	**1.54e+004**	**4447**	**1.493e+004**	**1.503e+004**
RankOfSample9	**9193**	**9711**	**1.111e+004**	**1.135e+004**
RankOfSample10	**4478**	**7752**	**8294**	**5641**
RankOfSample11	**7666**	**1.366e+004**	**6684**	**8168**
RankOfSample12	**6414**	**7948**	**5887**	**6527**
RankOfSample13	**6392**	**9521**	**1.188e+004**	**9941**
RankOfSample14	**8405**	**8190**	**8752**	**8644**
RankOfSample15	**9532**	**1448**	**1.569e+004**	**1.56e+004**
RankOfSample16	**1.194e+004**	**1.391e+004**	**9143**	**1.065e+004**
RankOfSample17	**1.123e+004**	**8248**	**1.164e+004**	**1.152e+004**
RankOfSample18	**1.039e+004**	**9961**	**7948**	**8613**
criterion	**449.7**	**455.9**	**360.7**	**423.7**
p-value	**-2.161e-008**	**-2.161e-008**	**-2.161e-008**	**-2.161e-008**