Plasma Orbital Expansion of the Electrons in Water

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Brown's Gas boasts a plethora of unusual characteristics that defy current chemistry. It has a cool flame of about 130°C (266°F), yet melts steel, brick and many other materials. Confusingly, research both confirms and rebuffs many claims about it, leading to a smorgasbord of theories today seeking to explain its unusual properties. One possible theory, currently gaining support even from establishment science, depicts "plasma orbital expansion of the electron in a water molecule". In this process, unlike electrolysis, the water molecule "bends" into a linear, dipole-free geometry. This linear water molecule expands to gain electrons in the d sub-shell, and these extra electrons produce different effects on different target materials. Electrons that scatter at point of contact produce heat based upon electrical conductivity, density and thermal capacity of the material. It also shows why Rydberg clusters are a part of browns gas and how the linear water molecule needs these clusters to survive. This paper will explain this new theory and why it is gaining popularity among scientist in academia.

1. Introduction

George Wiseman defines Brown's Gas (I agree with this definition) as "the entire mixture of gasses evolving from an electrolyzer specifically designed to electrolyze water and not separate the resulting gasses." Brown's Gas is unique. It has testable properties that show something is different about this gas. This paper shows the possibilities that exist to help explain this phenomenon.

One of the key differences in Browns gas is that some of the water molecules go into an excited isomer plasma state; hence Brown's Gas has more energy density because water molecules have more energy and are in small clusters called Rydberg Clusters. Rydberg Clusters are atoms and (or) molecules that are weakly bound by the electrons and the electromagnetic force together in miniature clusters. Plasmas are partially ionized gas, in which a certain proportion of electrons are free rather than being bound to an atom or molecule. The ability of the positive and negative charges to move somewhat independently makes the plasma electrically conductive so that it responds strongly to electromagnetic fields.

In Brown's Gas there is a unique form of plasma in which electrons are weakly held rather than free floating. This is known as "Non-equilibrium plasma" or "cold plasma". In this type of plasma the electrons have high energies but the molecules or atoms that hold the extra electrons are relatively unenergetic. In a Brown's Gas torch, these extra electrons are what produce the immense heat, while the molecule or atoms releasing these electrons remains relatively cool. By definition, an isomer is any molecule that has the same number and type of atoms, like H_2O is always going to be water, but the structure or orientation of those atoms in the molecule may be different.

In Rydberg clusters this new form of water can exist much longer than if by itself. This allows the gas to hold more energy than normal H_2 and O_2 mixed and ignited.

2. Isomers of Water

There are ways to determine the stability of isomers. Some isomers of molecules are naturally stable, but most of these unusual isomer states are unstable and will not last long. One method is to determine how much hold the atoms in a molecule have for their electrons and how much room there would be for more. The original water molecules exist in a sp3 hybridized state whereas the "linear" molecule would have to use the d sub-shell of the n = 3 shell to become a sp3d hybrid state. This allows for the expansion of the extra electrons (but it will not hold them for long). Upon relaxation it would resume its original state reclaiming its polarity and attraction to other water molecules.

The water molecule would go from the tetrahedral and bent shape (4 electron pairs, 2 used and 2 not used) to the trigonal bipyramidal (5 electron pairs, 2 used, 3 not used) and linear shapes, as in Figure 1.

The energy that was soaked in to the new state is not very stable and will quickly release the extra electrons and fall back into its regular state (just water). Rydberg clusters hold it in this new state and will cause the isomer to last much longer then if this isomer were by itself. Water in most forms is a great insulator. However in this odd form of "electric steam" it would act very much like a conductor. Indeed, Browns gas seems to be great at conducting electricity.

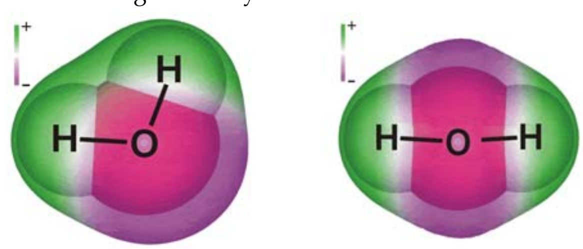

Fig. 1. Normal vs. linear water molecule

This new 'electric steam' is a form of plasma where only the electrons would be excited, and the water molecules would be much cooler. Water vapor molecules will be broken up in the plasma, but we find that Brown's Gas has a significant amount of water in it. This would actually be absorbing a huge amount of energy and lower the total amount of energy per liter, but this is not the case. The water is protected if in a non-equilibrium plasma state. This means that it still water but has a 'shell' or 'layer' of electrons being carried piggy-back by the water as seen in figure 1. Also Rydberg clusters hold more energy density and keep the new water isomer stable longer.

If one was to take the individual atoms found in water and combines the orbitals of each atom, the hydrogen can have a max of 2 electrons and the oxygen will have a max of 8 electrons. The oxygen is the only thing big enough to take on more electrons, however the Octet rule will not allow for it. The Octet rule says that certain atoms, like oxygen, can have up to 8 bonding electrons. One thing to note is the octet rule CAN have exceptions, when dealing with isomers, excimers, and cold plasmas.

3. Production Process of the New Water Isomer

In order to be conductive, a continuously bonded substance needs to have a way for electrons to move through it. Water with ions in it passes electrons along through unoccupied orbital sites in the ions.

A substance such as salt would provide the ions needed to lower the resistance of pure water. In substances, electrons are pushed along by what is called a conduction band and a valence band.

These correspond to the LUMO and the HOMO. The LUMO and the HOMO are acronyms for Highest Occupied Molecular Orbital and Lowest Unoccupied Molecular Orbital. The LUMO, or conduction band, has some spots with no electrons in it, otherwise known as unoccupied. The HOMO is full of electrons; it cannot push them along because it is full. Therefore, in order for the material to conduct, the material needs to excite electrons from the HOMO to the LUMO so they can move through the substance. The LUMO and the HOMO are way too far apart for conduction to take place. The energetic cost of exciting the electrons is just too high. Putting enough energy in would break the bonds in the material, destroying it, before it will conduct in this way.

Electrons can also move through "holes," or unoccupied spaces in an unfilled HOMO state. There is a place for an electron to move into in the HOMO, so the material can "push" electrons across itself, from hole to hole. Water has no holes for any electrons to move to. Since this avenue of electron-pushing is closed, and the electrons can't reach the LUMO energetically; they can't move in water.

This is why if too much energy is pressed into water it will break into hydrogen and oxygen. Oxygen attracts electrons much more strongly than hydrogen (more electronegative), resulting in a water molecule having a positive charge on the side where the hydrogen atoms are and a negative charge on the other side, where the oxygen atom is. Electrical attraction between water molecules is due to this dipole nature of individual water molecules to pull each other closer together, making it more difficult to separate the molecules (meaning the charge differences will cause water molecules to be attracted to each other).

This attraction is known as hydrogen bonding. Surface tension is a manifestation of this unique bonding. Hydrogen bonding is a comparatively weak attraction compared to the covalent bonds within the water molecule itself. In Brown's Gas the new trigonal bipyramidal (linear) water molecule will be non-polar and will have a dipole-dipole with the negative charge pointing toward the oxygen. The hydrogen bonding will be weakened considerably but could still exist.

The reason that some of the water molecules gets "stuck" in a linear form and do not break down in to hydrogen and oxygen is because the water isomer gets surrounded by hydrogen ions, oxygen ions and water vapor. The forces that are binding the clusters are electric and partially hydrogen bonding. However the interactions are a weak attraction and are known as Rydberg clusters.

4. Energy in Brown's Gas

Because water normally is within the N=2 shell, it needs a lot of energy to move up and would rather break down into Hydrogen and Oxygen then move up. However Brown's Gas may be moving up a level and storing the extra electrons in the N=3 orbital. Each gap holds a large amount of energy.

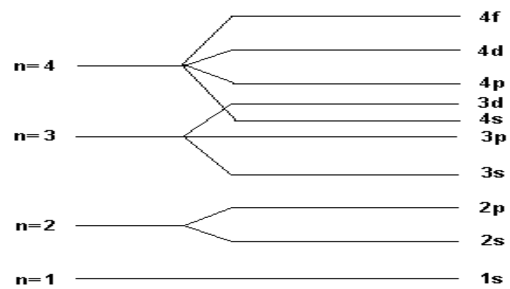

Fig. 2. N orbital's with corresponding sub-shells

The electron density also makes it appear to still be in the range of water, not O_2 or H_2 or O or H, since none of them seem to give right answers mathematically for the electron densities. However Brown's Gas does. It is a unique relatively unknown structure of water.

Normally, the field present in the wire would create a net acceleration in the same direction of the force; however the constant collisions of electrons create a drag effect. The effect on a hole is an average group velocity referred to as the drift velocity v_d (in m/s). It is found by the following equations:

$$v_d = \frac{J}{n_e e} = \frac{V}{n_e e \rho L}$$

J = Current density (Amp/m^2)
n_e = Free electron density of material in water (particles/m^3)
e = Electron charge (1.602 x 10^{-19} C/particle)
V = Applied voltage (V)
ρ = Resistivity of the material (Ω-m)
L = Path length (m)

Using these equations will help to determine what amount of joules the electrons carry in the gas. The material being hit by Brown's Gas has those extra electrons transferred into the new target material. Those electrons disperse causing high heat due to the electrical resistance of that material. There is a point where the current density can become so large that the lattice binding energy in most materials can be overcome; this results in what is called the fusing point. The fusing point is a critical falling apart of the atomic structure, causing intense heat and energy.

The amount of joules that is added to browns gas due to the extra electron presents would be approximately 600 (±34) joules per liter of Brown's Gas. This shows about the amount needed to be added to just hydrogen and oxygen burning to be in the area of Brown's Gas (about 1500 joules per liter). This result helps strengthen the fact that Brown's Gas is electrical in nature.

5. Rydberg Clusters

The linear water isomer is stable if it contains Rydberg matter clusters. These are clusters of highly excited matter (microscopic); the electrons are usually free floating in a limited area and can be bound by individual atoms or molecules. The life of a cluster will be dependent on what type of atoms and molecules make it up and will range from a few nano-seconds to a few hours. In lab experiments Brown's Gas average life is 11 minutes. Rydberg matter clusters are usually associated with solids and liquids, but can be found in gases. Something also intriguing is Rydberg matter clusters can be made using a unique electrolysis process in which special lengths and distances of the plates and the materials are used.

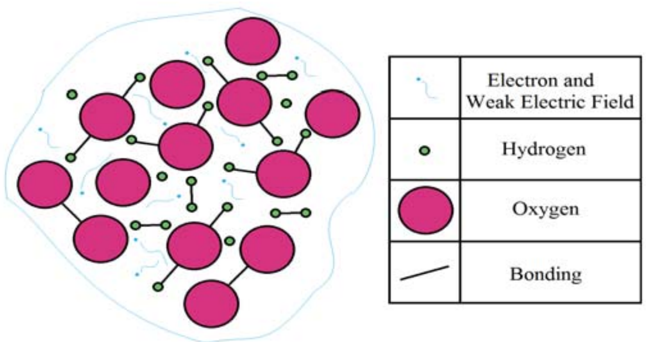

Fig. 3. Possible Rydberg cluster found in Brown's Gas

The Rydberg clusters may have hundreds to thousands of individual atoms and molecules in one cluster. Figure 3 depicts a Rydberg of a heterogeneous mix of water vapor, the linear water isomer, some free electrons, monatomic and diatomic hydrogen, monatomic and diatomic hydrogen, and some trace elements.

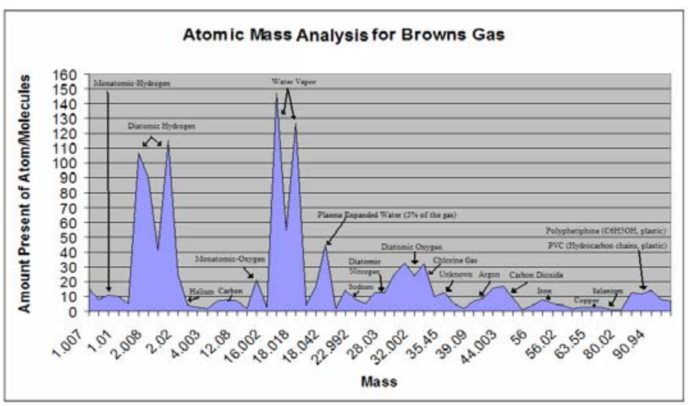

Fig. 4. Number of atoms or molecules (1000s) found in Brown's Gas

Figure 4 shows a break down of the elements and molecules of Brown's Gas. There are four main peaks above 30 thousand particles present in the test; these peaks are the basis of Brown's Gas. The first peak (from left to right) is diatomic hydrogen and is found in abundant amounts in the Brown's Gas mixture. There are two peaks due to the fact that there were isotopes of hydrogen in the test sample. The next major peak is water vapor, this normally would be undesired because it would take from the energy of the gas, but it is needed to form the Rydberg clusters. Therefore the water in Brown's Gas is needed to help increase the energy density of the gas. There are two peaks here because there are isotopes in the water as well.

The third peak is the one that was deemed unidentified by the test, but it is proposed that this is the linear water isotope, because it contains the weight of water with a few extra electrons. If this is the linear water molecule, than it is only making up about 3 to 12% of the total gas. It would not form if there were no Rydberg clusters present! It needs the other gases to make it stable as seen in figure 3. The fourth peak is the diatomic oxygen. This is less then what would be expected in normal electrolysis, but is normal in Brown's Gas.

Some things to note are the presence of monatomic hydrogen and oxygen, but in very small parts. Normally monatomic hydrogen and oxygen would bond right away to form H_2 and O_2, but it does not in Brown's Gas, they remain ions. This helps to prove that Rydberg clusters are forming.

There are also other trace elements, most likely due to exposure to those elements while forming in the tank, impurities in the water and traveling down the tube.

Evidence that Rydberg clusters have formed lies in the fact that when compared with the molar content of two parts hydrogen and one oxygen (compared to three molar of Brown's Gas), the Brown's Gas is significantly heaver. The same molar content shows that the density (not energy density) of Brown's Gas is much greater than that of just hydrogen and oxygen. If this weight was that of water then the Brown's Gas would be a poor torch and transfer very little heat. In fact, most of the heat would be absorbed into water vapor before hitting the target material.

However, for the case of Brown's Gas, this water is trapped in energetic states with ions and a new form of linear water isomer. This gives the gas a higher energy per volume (note that molar and volume are very different) then that of hydrogen and oxygen.

6. Brown's Gas Plasma Reaction to Materials

Brown's Gas will produce a different temperature at point of contact depending on the target material. This is because electrons that scatter at point of contact produce heat based upon the melting or vapor point of the material, electrical conductivity, density and thermal capacity of the material (how much heat it will absorb). The extra electrons in the Brown's Gas will repel nearby electrons of the target material. The electron's new neighbor electron in the target material finds it repulsive, and will move away, creating a chain of interactions that propagates through the material at near the speed of light.

The drift velocity (electrons movement in a material) is usually fractions of a millimeter per second, but if there are too many electrons in one spot, the target will fall apart, at an atomic scale, due to the sudden introduction of the new electrons and the repelling negative forces.

These high energy electrons will not travel as fast as the gas was traveling, when it hits the surface of something the electrons will slow down significantly, thus releasing their kinetic energy as heat; the more dense and resistive the material the hotter it will be, the less dense or more conductive the material results in less heat being generated. Almost everything gets hotter when used as a resistor for electricity.

7. Electrical Presence

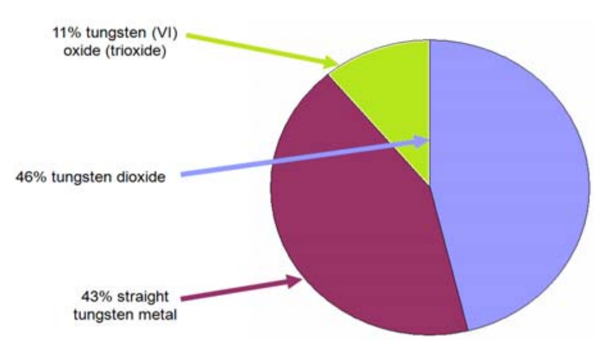

Fig. 5. Tungsten and its oxides found in a Brown's Gas torch

Laboratory gas spectrometer analysis was used on the Brown's Gas and Tungsten. It proved that about 46% of the gas was tungsten dioxide, 11% was tungsten (VI) oxide (trioxide) and the rest was about 43% straight tungsten metal, it was found that electricity will commonly make tungsten dioxide. Normally, "WO_2 is prepared by reduction of WO_3 with tungsten powder over the course of 40 hours at 900 °C".. It also has a super high electrical conductivity and shows promise for superconducting materials at high temps. The one that nature prefers is WO_3. Attempts to replicate it using an Acetylene Torch failed to replicate Brown's Gas results. There were some amounts of WO_3, as expected, but negligible amounts of WO_2 when compared to Brown's Gas; this shows that Brown's Gas burns differently than an Acetylene Torch. Using electricity oxidize tungsten, the experiment found that there were similar ratios of tungsten oxides (within 12% of BG's numbers). Straight Tungsten oxide is not common and was negligible < 0.001% in the results. Small amounts of water and even smaller amounts of H_2 and O_2 were found, confirming an electrical presence.

8. Conclusion

Brown's Gas is different than other electrolysis processes. This paper's introduction started out by quoting George Wiseman. He states "the entire mixture of gasses evolving from an electrolyzer specifically designed to electrolyze water and not separate the resulting gasses." The main point of this paper is that Brown's Gas is unique and different.

Normal water molecules exist in a bent shape, if this water molecule were to gain electrons it would normally break down into hydrogen and oxygen, hence electrolysis of water. In Brown's Gas this processes takes a slightly different turn where the water molecule will "bend" into a linear water molecule.

The water molecule shape goes from the tetrahedral and bent (4 electron pairs, 2 being used and 2 not being used) to the trigonal bipyramidal (5 electron pairs, 2 being used and 3 not being used) and linear, this causes the shape change.

The new "linear" water molecule gains new electrons that would have to use the d sub-shell. Gaining the use of the d sub-shell allows for the expansion for the extra electrons. It is these electrons that produce different effects to different target materials, because electrons that scatter at point of contact produce heat based upon the electrical conductivity (or resistance), density and thermal capacity of the material (how much heat it will absorb).

To survive the length of time that the linear water molecule does requires some kind of support. It must be in a Rydberg cluster. Water vapor is important also. It all helps to trap extra energy and hold it until it reaches the torch nozzle and is ignited.

This paper also stresses the fact that one thing is abundantly clear: Brown's Gas is ELECTRICAL in nature, not chemical! More research is needed to establish the fact that this linear isomer is essential for the formation of Rydberg clusters. Why does it need it to form these clusters? Why do O- and H+ remain stable in a Rydberg cluster? What special conditions (in the electrolyzer) are needed before the formation of Rydberg clusters happen? Why do different types of electrolyzers produce different amounts of Brown's Gas?

There are many possibilities for the Brown's Gas torch. There are new alloys that can form under this unique gas. There are new materials that can form. It can cut with laser like precision. It can weld (certain materials/metals) without the use of flux. This is due to the oxygen being used up by the hydrogen, thus little to no oxidation of metals occurs. It produces a range of different effects in different materials, due to the interactions of the electrons in the material and the electrons in the gas. There are great possibilities for the future.

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