"Many people, especially ignorant people, want to punish you for speaking the truth, for being correct, for being you. Never apologize for being correct, or for being years ahead of your time. If you're right and you know it, speak your mind. Speak your mind. Even if you are a minority of one, the truth is still the truth."

Mahatma Gandhi

"Nothing is lost, nothing is created, everything is transformed"

Antoine Laurent Lavoisier

"Water cannot be created or destroyed. Water can only change from one form to another; gas, vapour/steam, liquid or solid ice. Water is and always will be water"

Peter Peterson

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Turning Water Into Fuel | Hakai Magazine
The Sci Guys: Science at Home - Electrolysis of Water
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100 Reasons Water
Is Not H20

Independently Published
1st Edition (Revised)

Introduction

It would be silly for anyone to deny the levels of mistrust that exist within human existence and everybody discovers through one way or another that people can and do in fact lie or can offer incorrect information, whether knowingly or unknowingly; it is a fact of life.

During our lives we are presented with a vast amount of information and yet, how can we ever know the information is true or untrue? There has to be at least some information that isn't true. Surely?

Mr A - "Excuse me, can you tell me where the Post Office is?"
Mr B - "Errm. Yeah. If you take a right at the end of the street, carry on you'll come to a set of lights. Take a left and the Post Office is somewhere up on the right. You can't miss it!"
Mr A - "Okay. Thanks" and walks away.

Mr B - Asks himself "now was it left or right at the lights?"

Whatever the case, we can scrutinise a great deal of information for ourselves to determine whether something is true or not. For example a friend may claim they purchased a hat for £100 at a certain store. Yet if we were to conduct a little research, we might discover the store doesn't exist or the hat only cost £10. So we have determined for ourselves the friend's claim is false.

However, in many cases we cannot assess the veracity of a claim as we are unable to gather supplementary information. One such example is the alleged historical epic journey of Hannibal.

All of us were not alive during the time Hannibal allegedly crossed the Alps with elephants. So how do we know the journey ever took place? None of us can ever know if such a feat really can be achieved? We cannot follow in Hannibal's steps along with elephants to find out. In fact, none of us can verify the information supporting his adventure.

So we have to take it upon ourselves to evaluate the merits of these claims and weigh up the veracity or falsity of them in the best possible way.

In the case of Hannibal, we are forced to accept things at face value but in so doing we leave ourselves vulnerable; in a precarious situation as there is always the possibility the information is untrue and Hannibal never crossed the Alps with his elephants at all. In actual fact, the story of Hannibal and his elephants may simply have been conjured up within someone's imagination to make the history of man exciting and appealing. Who knows?

Regardless of this, many people do accept unverifiable pieces of information to be true and the adoption of such risky rationale provides a platform for 'givens' or axioms to thrive.

Conducting a brief online search, the Cambridge Dictionary defines the word 'given' in the adjective form as :-

"already decided, arranged, or agreed"

Similarly, an axiom or postulation is a statement that serves as a premise or starting point for further reasoning and argument.

However within such discourse, although it is possible for an axiom to provide a foundation within many disciplines any axiom or given could be untrue.

So it is only right that most, if not all 'givens' or axioms should be brought into question and it is only proper for one of sound and reasonable mind to explore the plausible fact that a number of 'givens' or axioms, forming the basis of much thought, experimentation and understanding, could in fact be false.

One such 'given' or axiom being challenged in this e-book is the claim water is H2O – water comprises 2 parts hydrogen and 1 part oxygen.

Through the following pages and in no preferential order, 100 reasons why water, the most basic resource for life to exist can never be comprised of hydrogen and oxygen will be presented.

The ideas and views expressed in this e-book are thought provoking and therefore open to critique, so it is with this in mind the '100 reasons' have been written concisely, in a straightforward manner and supplementary information has been included wherever possible. A short glossary of relevant terms can be found at the end.

The e-book does cover areas in Chemistry and highlights a few chemical processes but these have been detailed in a succinct manner and kept to a minimum.

The views expressed in this e-book are of the author’s and these have only been based upon available information researched by the author.

The e-book serves only to offer an understanding that water is not hydrogen and oxygen (H2O) and enables any reader to think more about the true nature of water through the eyes of the author.

The contents in no way attempt to represent or replicate any form of scientific paper or publication. The contents merely serve as a critique of current understanding that water comprises hydrogen and oxygen; highlighting flaws, discrepancies, misjudgements etc.

So, what proof is there that water is comprised of hydrogen and oxygen?

Let us find out….

Brief Information About The Author

Over 49 years, the author has developed a unique understanding of the human experience and human behaviour. Having studied psychology, developing a questioning mind has always been intrinsic in attaining an understanding where the author can lay bare many claims made within many areas of modern society.

The author has examined Chemistry from a completely different perspective and from this standpoint it can be observed that many people's perceptions have been clouded by the education that surrounds this science. It is unfortunate many are unable to 'see' the simplicity even within a chemical reaction.

It is not the intention of the author in this e-book to discredit science. The author recognises science has been welcomed by modern society for good reasons; science in many respects is of benefit to mankind. However, when the author cannot obtain oxygen that has been generated solely by a plant through the process of photosynthesis, the science then becomes questionable.

In other words, when the practice of science does not match the theory of science, we have to question whether the science is true.

So, with sufficient research, some historical notes and a general understanding along with a keen interest of modern methods of manufacturing and industry, the author has now arrived at the indisputable conclusion that water is not comprised of hydrogen and oxygen (H2O). Water is simply, water.

The author hopes you enjoy reading and find the e-book full of interest. By that time hopefully you will be able to understand how the author has arrived at his conclusions.

PP 14th September 2018

Let’s begin…..

“Hydrogen is a chemical element with symbol H and atomic number 1. With a standard atomic weight of 1.008, hydrogen is the lightest element on the periodic table. Its monatomic form (H) is the most abundant chemical substance in the Universe….

…and yet hydrogen does not occur naturally as a gas on Earth”

“Oxygen is a chemical element with symbol O and atomic number 8. It is a member of the chalcogen group on the periodic table, a highly reactive nonmetal, and an oxidizing agent that readily forms oxides with most elements as well as with other compounds….

…and yet it is water alone that is responsible for a number of Oxides to occur e.g. Iron Oxide (Rust)”

Peter Peterson

1

Through demonstration, nobody has ever produced ‘new’ water in any form solely from the reaction of hydrogen and oxygen to support without question whatsoever the ‘claim’ water is comprised of hydrogen and oxygen. Although many demonstrations purport to show the production of water by reacting hydrogen and oxygen gases through combustion, never, at any time, is any ‘new’ water produced that is demonstrated to have come solely from the hydrogen and oxygen reaction.

In all cases ‘new’ water is merely ASSUMED to have been produced as a result of any combustion.

2

Conversely, nobody has ever ‘split’ water alone into hydrogen and oxygen and demonstrated the gases produced evolved solely from the water.

Several methods are currently employed to allegedly ‘split’ water into hydrogen and oxygen like Electrolysis, however such methods are presented in a contrived manner to force most observers to merely ‘think’ water is comprised of hydrogen and oxygen when in fact, it is not. This point will be made clearer the more we move forward.

3

WIKIPEDIA
The Free Encyclopedia

Currently, if one was to search through Wikipedia's entry on Water one will not be able to establish exactly who discovered water to be comprised of hydrogen and oxygen. Unlike other entries found in Wikipedia, notable figures are always named in the discovery of chemical substances whereas the origins of water being H2O seem to be elusive.

It is also ironic Wikipedia refers to water even as a chemical substance when in fact it is not.

4

It is commonly understood that hydrogen and oxygen in elemental form exist as gases at room temperature under 1 atmosphere. But water exists as liquid at room temperature under 1 atmosphere also. There is no widely accepted definitive explanation that can adequately account for the above observation. It would appear nobody knows exactly how it is possible for two gases to exist at room temperature, as gases, yet come to exist as a liquid at the same temperature? The author can only put forward that it is impossible for this to occur and water is not made of hydrogen and oxygen.

5

Hydrogen, in a fully liquid state without boiling at atmospheric pressure, needs to be cooled to at least -252.87 °C whereas water, which is supposed to comprise hydrogen, can exist naturally in its liquid state at a much higher temperature. Nobody can adequately explain how elemental hydrogen can exist as a liquid at such a low temperature yet be one of the two components of a liquid at a much higher temperature?

6

Oxygen, in a fully liquid state without boiling at atmospheric pressure, needs to be cooled to at least -182.96 °C whereas water, which is supposed to comprise oxygen, can exist naturally in its liquid state at a much higher temperature. Again, nobody can adequately explain how elemental oxygen can exist as a liquid at such a low temperature yet be a component of a liquid at a much higher temperature.

7

The freezing point of hydrogen under normal atmospheric pressure is -259.2 °C whereas water, which is supposed to comprise hydrogen, freezes at 0°C also at normal atmospheric pressure. Nobody can adequately explain how elemental hydrogen can exist as a solid at such a low temperature yet be one of two components of a solid at a much higher temperature.

8

The freezing point of oxygen under normal atmospheric pressure is -218.8 °C whereas water, which is supposed to comprise oxygen, freezes at 0°C also at normal atmospheric pressure. Nobody can adequately explain how elemental oxygen can exist as a solid at such a low temperature yet be a component of a solid at a much higher temperature.

9

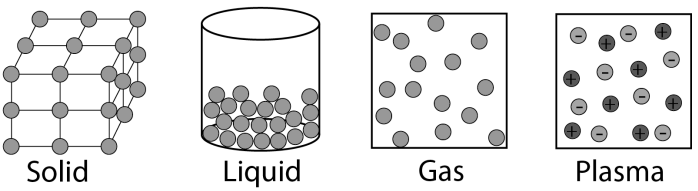
The boiling point of hydrogen under normal atmospheric pressure is -252.9 °C whereas water, which is supposed to comprise hydrogen, boils at 100°C also at normal atmospheric pressure. Nobody can adequately explain how liquid hydrogen can boil and start to exist as a gas at such a low temperature yet be a component of a liquid that boils at a much higher temperature.

10

The boiling point of oxygen under normal atmospheric pressure is -183 °C whereas water, which is supposed to comprise oxygen, boils at 100°C also at normal atmospheric pressure. Nobody can adequately explain how liquid oxygen can boil and start to exist as a gas at such a low temperature yet be a component of a liquid that boils at a much higher temperature.

11

Currently, within the scientific paradigm there are four observable phases, or states of matter; solids, liquids, gases and plasma. Water is conventionally considered to exist in three different states; either as solid ice, liquid water or ‘vapour gas’. We can accept water to exist as a solid and liquid but how can we accept water to exist as a ‘vapour gas’?



A vapour refers to a liquid substance that is evaporating and thereby transitioning between two states of matter; liquid and gaseous phases. Given this, how then can anybody reconcile the 'vapour gas' state of water to actually be a recognised state of matter?

The 'vapour gas' state of water cannot be satisfactorily assimilated within the four states of observable matter. This makes one wonder, not only what a ‘vapour gas’ is but what is the true nature of water?

12

Water is a substance that essentially decomposes or breaks down matter into components. For example steel wool placed in water will observably decompose into iron ore (oxide) and coke - the constituents of steel. It is for this reason why water, either in its liquid or steam/vapour forms is used extensively within numerous manufacturing and industrial processes. Unsurprising also why water is the main constituent of countless cleaning products.

Yet given this, the author is unaware of any substance that will decompose water into two separate elements; hydrogen and oxygen.

Therefore, because of the inherent nature of water's characteristics and decomposing abilities, it is more reasonable to consider water to be an element or substance in its own right.

Fact - It is healthy to drink water with meals, as it aids the process of digestion; the decomposition of food.

13

Water does not conduct electricity but it is only the impurities that exist within water that do. Given this understanding, any claim that purports water can be split by using electricity in the form of a direct current e.g. Electrolysis, has to be false.

Pictured above is a typical TDS meter which measures the total dissolved solids (impurities) within a sample of water. The product relies on electrical conductivity between two electrodes to determine the amount of dissolved solids that are present.

So if a sample of water contained no impurities, there would be no conductivity and a value of 0 would be recorded which would render the electrical device useless even though water would still remain.

This electrical device in itself demonstrates water does not conduct electricity and it is only the impurities, in this case dissolved solids in water that do conduct electricity.

14

It is commonly understood that condensation forms whenever a gas appliance is being used e.g. cooker or oven. Many people understand the condensation to be a by-product of the natural gas being burned in air; hydrogen contained in the natural gas combusts with the oxygen in the air to form water.

However what many people fail to realise is that water is widely used within the extraction and refining of natural gas with 400 million gallons of water consumed daily in the United States for natural gas refining and pipeline operations alone.*

Given this, it is understandable that any supply of natural gas produced in the manner described will contain water and any gas burned at any appliance will release a form of water.

So most condensation produced is not the result of burning hydrogen gas in air (oxygen) but rather the case water (in whatever form) from the supply pipe is released and condenses as a liquid on colder surfaces.

*https://www.ucsusa.org/clean-energy/energy-water-use/water-energy-electricity-natural-gas#sources

15

"Condensing boilers/furnaces are water heaters fuelled by gas or oil. They achieve high efficiency (typically greater than 90% on the higher heating value) by condensing the water vapour present in the exhaust gases thereby recovering its latent heat of vaporisation, which would otherwise have been wasted."

This is further information that supports the view water is already present in the gas supply pipeline and not a product of the combustion of the gas in the air (oxygen).

16

It is not uncommon for consumers to report problems in their gas supply. For example, the flames produced from the combustion of gas at the appliance can burn orange rather than blue. Such problems can be caused by a build up of water inhibiting the gas supply.

It was reported in a BBC news article* that 450 properties had been without gas in the Preston area of Weymouth, Dorset, England after water leaked into a gas main. "A second point where water entered the supply was later discovered and the water extracted", gas company SGN stated.

Water was found to have affected properties in 15 streets.

At no point in the article was it mentioned any water company was involved to identify and repair any water leak. Furthermore no resident reported a problem with their water supply.

This information clearly supports the view that water, in whatever form, is present in gas pipelines.

*https://www.bbc.co.uk/news/uk-england-dorset-29911276

17

It is important for terminology to be accurate. Wikipedia defines an electrolyte as:-

> A substance that "produces an electrically conducting solution when dissolved in a polar* solvent, such as water."

and eMedicineHealth defines an electrolyte as:-

> A substance that "dissociates into ions in solution acquires the capacity to conduct electricity."

Both definitions place an electrolyte in water whereas many chemical compounds e.g. Lead Bromide and Sodium Chloride undergo electrolysis whilst in a molten state thereby not requiring dissolution in water.

So because an electrolyte need not be dissolved in water to be an electrolyte, it is more accurate to define an electrolyte to be:-

> "A substance that undergoes ionic disassociation thereby developing the ability to conduct electricity."

It is clearly evident sources of information misrepresent the word electrolyte and it is the author's understanding the only reason for this, is to help project in people's minds electrolysis and water share an affinity and that affinity is hydrogen and oxygen.

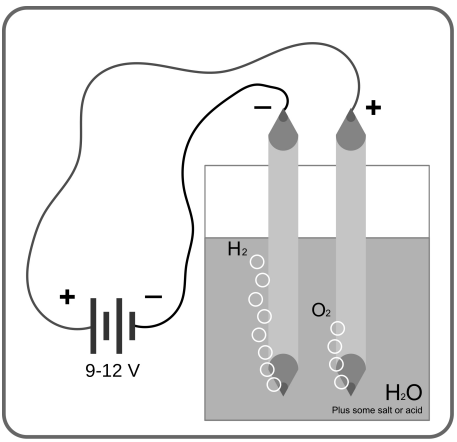
* see electrical polarity in glossary

18

It is said water can be split into its components of hydrogen and oxygen simply through the process of electrolysis. The ‘electrolysis of water’ as it is commonly known ALWAYS requires a substance i.e. a salt or acid, to be dissolved in the water for the process to take place.

If water is composed of hydrogen and oxygen and is polarised then it should be more than possible to disassociate these two elements using electrolysis without the need to use an electrolyte.

However this is not the case.



Above is a simple set up demonstrating electrolysis of water at home, as outlined in Wikipedia.*

Within the electrolysis process, water merely breaks down or decomposes electrolytes, producing ionic disassociation thereby promoting the capability of the electrolyte to conduct electricity.

For example, if strontium chloride is placed in water, the water will decompose the salt in such a manner to 'liberate' the strontium from the chloride; ionically disassociating one from the other and thereby promoting the ability of the strontium and chloride to conduct electricity.

Remembering polarisation and ionic disassociation are fundamental to the electrolytic process, because electrolytes MUST be used for the electrolytic process to occur, so it is the author's understanding that water is not polarised and cannot undergo ionic disassociation.

*https://en.wikipedia.org/wiki/Electrolysis_of_water

19

A major reason why people consider water to electrolyse and subsequently ‘split’ into hydrogen and oxygen is that the amount of water remaining after the electrolytic process has ended is less than the amount of water present at the start.

This loss is explained by hydrogen and oxygen in the water splitting and thus leaving as gases hence reducing the amount of water.

However, no proof supports this claim especially given water is likely to be lost through evaporation as the process of electrolysis can take a considerable length of time.

20

Within the electrolysis of certain electrolytes like Sodium Chloride (salt), it is said that as soon as Chlorine gas has been exhausted from the chloride part of the salt, one will start to produce oxygen which is said to originate from the water.

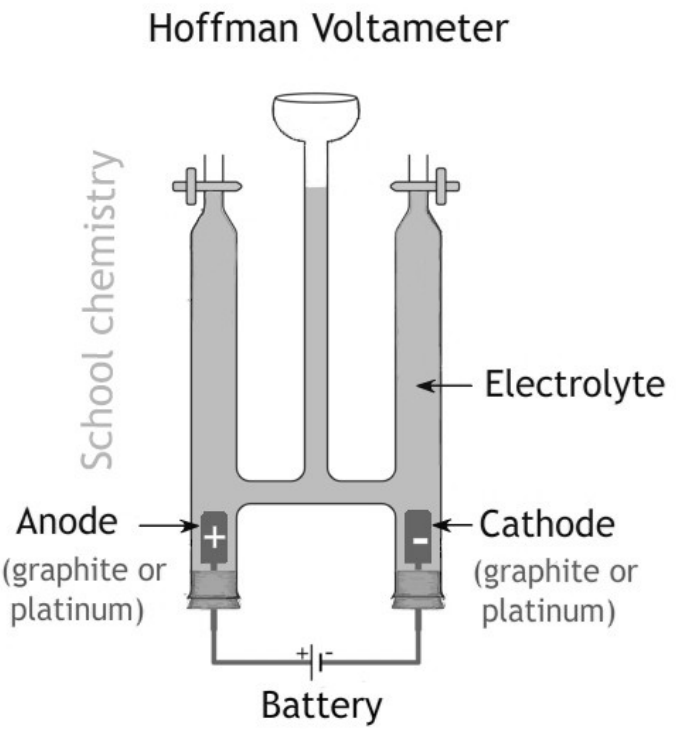
However it is more accurate to observe that when the chloride part of the salt has been exhausted, decomposition of the electrode begins and this is where any oxygen is sourced.

It must be borne in mind electrodes form part of the electrolytic process and are contained within the solution so are liable to decompose as much as an electrolyte, given the correct conditions.

Therefore electrolytic gas products like hydrogen and oxygen simply cannot come from the water and originate from either the electrolyte or from the decomposition of the electrodes.

21

Using a Hoffman Voltameter or similar setup and carrying out the ‘electrolysis of water’ procedure, it is claimed hydrogen and oxygen gases can be harvested at a ratio of 2:1 respectively, hence water’s chemical symbol of H2O (two parts hydrogen to one part oxygen).



However if it was true water is comprised 2 parts hydrogen and 1 part oxygen and the electrolytic process 'split' water, then the ratio of 2:1 would always be achieved regardless whether one changes the type and amount of electrolyte, increased or decreased the voltage or used different types of electrodes.

Yet this is not the case because in practice different ratios are generally obtained. For example, varying the type and/or concentration of the electrolyte in solution can yield ratios of 3:1 or even 4:1. In some instances, hydrogen and oxygen gases can be garnered at a ratio of 7:1.

The 2:1 ratio of hydrogen to oxygen is only theoretical and at best, can only be achieved if strict conditions were met. This demonstrates hydrogen and oxygen gases are not procured from the water.

22

"No one experimental reaction "proves" atoms, nor does all experiments."*

Given the above statement from an article entitled ‘How do we know what water really is?’ it is ridiculous to ever consider water to comprise of hydrogen and oxygen atoms when atoms cannot even be proven to exist by experimentation.

*https://www.forbes.com/sites/quora/2017/01/13/how-do-we-know-that-water-is-really-h2o/#20fe81bb3ae6

23

Hydrogen is a flammable gas and mixed with oxygen can explode and release a great amount of ‘energy’. However water comprises these two elements bonded together but extinguishes combustion; takes the heat out of a fire.

How can hydrogen and oxygen when bonded together have a completely opposite property to when hydrogen and oxygen are reacted together?

24

The claim water is hydrogen and oxygen is an axiom that exists within science. As already mentioned an axiom is a statement which is accepted without question and provides the premise or starting point for further reasoning or arguments. This means, any axiom cannot be proved within the discussion of a problem.*

Water being hydrogen and oxygen therefore is an axiom because it cannot be proved water is made of hydrogen and oxygen.

*
https://simple.wikipedia.org/wiki/Axiom

25

There are numerous tests to determine the amount of dissolved oxygen in water. One such test is the Winkler Test.

In this lengthy test, a salt such as manganese sulphate and potassium iodide are added to a water sample, reacting to cause a white precipitate of manganese hydroxide (Mn(OH)2) to form. This is allowed to settle and then a small amount of sulphuric acid is added to the solution. The introduction of the acid oxidizes the white precipitate leaving a ‘stable’ water sample containing manganese sulphamate.

Manganese sulphamate then converts iodide from the potassium to iodine and a sodium thiosulphate solution is then titrated into the water sample to react with any remaining iodine to form sodium iodide.

Starch indicator solution is then added to determine the levels of any remaining iodine. Starch indicator solution turns blue in contact with iodine. However, sodium iodide does not react with starch solution, so the water sample would remain clear.

From all of this, it is stated the amount of sodium thiosulfate solution added to turn the sample clear is directly proportional to dissolved oxygen initially contained in the water sample.

However from this information, it is very clear the Winkler Test does not test for dissolved oxygen in a sample of water at all but merely ascertains the amount of free iodine in solution.

Interestingly, the Winkler Test is a very strict procedure in the sense any deviations made from the prescribed method e.g. varying quantities of substances added to the water sample, would alter the amount of ‘free’ iodine available, subsequently affecting the resulting levels of dissolved oxygen.

It is further understood by the author oxygen is added to certain chemical substances during their manufacture. So the Winkler Test is nothing more than a method for determining levels of oxygen within chemical substances. (See also DO meters - reason 75)

26

Water often undergoes numerous processes to remove impurities and a wide variety of treated water is manufactured and available to purchase. Distilled, de-ionised or de-mineralised water are a few examples.

One method for treating water is the use of electrolysis via Electrodeionization.

In this process, water is passed between a positive electrode and a negative electrode. Ion exchange membranes allow only positive ions to migrate from the treated water toward the negative electrode and only negative ions toward the positive electrode.

Treated water therefore remains between each membrane. During any water treatment process involving electrolysis no hydrogen or oxygen is ever released, harvested and sold for resale.

This further proves that any gases obtained from the electrolytic process originate from the electrolyte and/or electrodes and not the water.

27

In all cases where phenomenal amounts of water is used within industry and certain manufacturing processes, the water consumed for such activity is never ‘made’ by reacting hydrogen and oxygen.

Water is always supplied in its own form to a manufacturing or processing plant from an external source e.g. a water treatment plant. It is possible that some processing plants have on-site water treatment plants.

28

In all cases where domestic water is supplied to homes, the water supplied is never created from a reaction between hydrogen and oxygen.

All supplied water is sourced from existing water resources that have undergone a water treatment process at a typical water treatment plant (pictured below).

29

It is never the case that hydrogen and oxygen in any state, whether liquid, solid or gas, are mixed to produce water in all of its different states of matter i.e. solid, liquid and 'vapour gas'.

30

Assuming water is H2O, it is said water has a molecular weight of 18.01528g/mol. Liquid hydrogen however has a molecular weight of 2.02 g/mol with liquid oxygen having a molecular weight of 32g/mol.

Given these figures, how is it possible that liquid oxygen and liquid hydrogen combined would have a mass of 34.02g/mol which is nearly double the mass of liquid water?

31

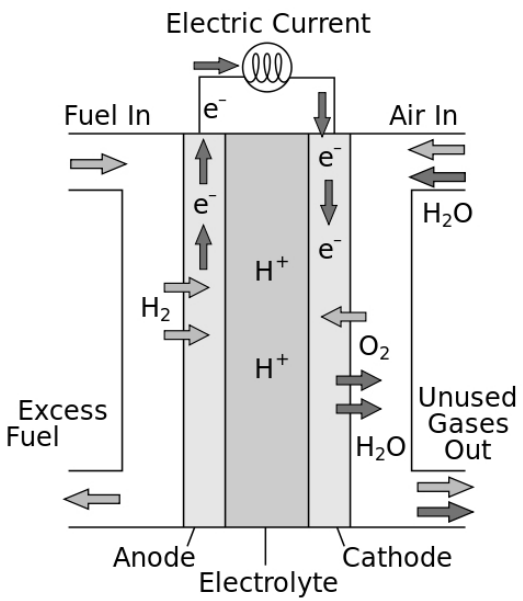
A lot of people fail to realise water, in one form or another, is everywhere. Water, as a liquid covers almost 70% of the Earth's surface and about 55% of the human body is made of liquid water. There is water existing within the air as 'vapour gas' and steam.

Even in the driest of places such as the Atacama Desert in Chile, South America, water is available in one form or another.

32

A fuel cell vehicle or fuel cell electric vehicle is a type of electric vehicle which uses a fuel cell, instead of a battery, or in combination with a battery or supercapacitor, to power its on-board electric motor. Many use compressed hydrogen gas and oxygen from the air in order to generate enough electricity to power the motor.

H2O supporters consider that small amounts of water produced at the tailpipe prove water is comprised of hydrogen and oxygen as both gases allegedly have been reacted to form the water.



However other reasons can account for the production of water at the tailpipe such as water vapour exiting the system after entering the system along with air or simple condensation, where the warmer ‘exhaust’ gases meet the cooler atmospheric air at the end of the tailpipe.

Additionally, water in one form or another would have entered the system along with the hydrogen fuel (see reason 63).

In any case, to ever think water is comprised of hydrogen and oxygen merely from the internal workings of a fuel cell vehicle is ill-founded.

33

Regarding the infamous 'electrolysis of water' procedure and given the prescribed, magical, 2:1 ratio of hydrogen and oxygen, the author placed 30grams of Lithium Hydroxide in a freezer unit at minus 8°C for at least a week and then proceeded to the electrolysis stage where it was added to 1 litre of water.

It was found the ratio of gas products far exceeded the 2:1 ratio thus giving further support to the fact the gas products originated from the electrolyte and NOT the water.

Caustic Soda or Processed Sodium Hydroxide (pictured), along with Lithium Hydroxide is an electrolyte used to obtain hydrogen and oxygen gases.

34

250g of sodium bi-carbonate was gently heated for a short duration to de-polarise the salt. It was then added to 1 litre of water and electrolysed using a copper anode, graphite cathode and a 7.2V D.C. voltage.

The author found although the copper anode decomposed, the ratio of hydrogen to oxygen given off at each corresponding electrode was in the region of 7:1.

Again, manipulation of the electrolyte prior to electrolysis directly affects the amount and rate at which gas products are collected.

This proves gases originate from the electrolyte and/or the electrodes and NOT the water.

35

Whenever a substance is oxygenated, water is never used to provide the oxygen required in the oxygenation process simply because there is NO oxygen in water.

A typical example where the word ‘oxy’gen is used within cleaning products give people the idea that the product relies on the oxygen in the water for better cleaning performance. The product pictured contains sodium percarbonate that is sodium carbonate and hydrogen peroxide. In reality, the cleaning ability is clearly derived from these two chemicals placed into solution, not from any oxygen in the water.

36

Likewise, whenever a substance is hydrogenated, water is never used to provide the hydrogen required in the hydrogenation process simply because there is no hydrogen in water.

37

Hydrogen is allegedly one component of water and yet the principle method for the production of hydrogen is steam reforming where steam reacts with natural gas (methane) at extremely high temperatures (700 – 1100 °C) to produce carbon monoxide, hydrogen and water vapour.

From this, does one seriously have to ask where the hydrogen gas actually comes from? It is a no-brainer of a question to ask whether hydrogen comes from the water or from the methane gas.

Surely it is blatantly obvious any hydrogen produced in this manner is solely derived from the methane and not the water.

38

Focusing upon Hydrogen's highly flammable nature, hydrogen is manufactured mainly by combining a highly flammable substance (methane) at high temperature with a non-flammable substance (steam).

Given this, it seems illogical and somewhat laughable to understand water to exist and be made up of a highly flammable gas when the characteristics of water do not reflect such nature of that gas. Furthermore, nobody can satisfactorily explain how water can extinguish a fire and yet be comprised of a highly flammable gas?

It would make more sense to understand water to be a non-flammable substance not comprising hydrogen and oxygen.

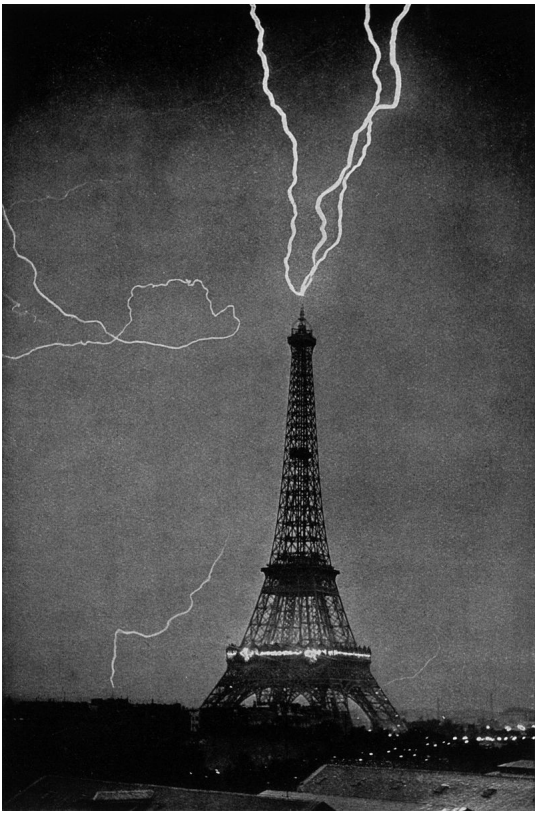
39

Likewise, oxygen is a gas that intensifies combustion. Liquid oxygen along with liquid hydrogen is used as rocket fuel. Oxygen is added to furnaces to increase temperatures and lower production costs.

It seems ridiculous that a substance like oxygen can be placed into a reaction to increase temperature but is allegedly bound to another gas in the form of water to cool things down.

40

During thunderstorms, the occurrence of bolt lightning in the atmosphere produces ozone, nitrogen oxides and other gases but fails to yield any hydrogen from any alleged splitting of water vapour that should be clearly present at such times.



41

Most elements burn with a particular flame colour; for example, the element calcium always burns with a brick red coloured flame. Hydrogen is an element and like any other element should repeatedly burn with the same colour flame.

Given this, if hydrogen is derived from the same single source i.e. water, one would expect the flame colour to be consistently the same but this is not the case as hydrogen burns with a variety of different coloured flames.

People have suggested the reason why hydrogen burns with different coloured flames is because during its production, hydrogen becomes contaminated with other elements.

However, 'scrubbing' hydrogen gas to remove contaminants has no affect on the flame colour and it is always the case hydrogen burns with a flame colour that is reminiscent of the element that was used to form the hydrogen.

For example, when electrolysing lithium hydroxide any hydrogen gas garnered at the cathode will burn with a very beautiful red colour reminiscent of burning Lithium.

Strontium also burns with a red flame and the hydrogen gas garnered from the electrolysis of Strontium Chloride will also produce a red flame colour. Sodium however burns with a yellow flame and the hydrogen gas garnered from the electrolysis of Sodium Chloride will produce a yellow flame colour when combusted.

In all cases, each flame colour of hydrogen will produce a colour flame reminiscent of the positively charged elemental part of the electrolyte. From this understanding, if hydrogen gas was sourced from water alone, the flame colour upon combustion would remain the same irrespective what electrolyte is used.

It is evident when electrolysing substances in solution that hydrogen gas originates from the main element that has been disassociated or decomposed by water to form it, rather than from the water itself.

From this it is reasonable to put forward hydrogen gas to originate from elements and not water.

42

HHO Generators are said to generate hydrogen and oxygen gases via the process of electrolysis. These gases are said to originate from the water.

However, HHO generators will only produce hydrogen and oxygen if an electrolyte is present in the water. When using an HHO Generator, the electrolyte is typically potassium hydroxide (KOH).

Again we have to reiterate that in this instance, it is the electrolyte that provides the source of any hydrogen and oxygen gas that is produced by the equipment. NO electrolyte means NO hydrogen and NO oxygen.

43

Water vapour is present within many chemical reactions. Temperature and pressure are also variables within all chemical reactions. Even the materials used as part of the apparatus within chemical reactions are variables within reactions. For example glass is an amorphous solid material and has low thermal conductivity. Its thermal conductivity value is about k = 1 W/m.K.

So the likelihood of condensation forming on glass is very high in all cases where water and heat are present.

Additionally, water vapour is present in the air and air is contained within most systems or 'set ups' of apparatus where chemical reactions take place. More importantly, liquid water itself is a variable and is present within many reactions. In fact many reactions would not take place if not for the presence of water.

So if water is formed after a chemical reaction has taken place, one should always question where the water came from and consider other variables to account for the presence of the water, like the water was already there to begin with in a different form, rather than forming due to any reaction between hydrogen and oxygen.

44

Presently, 10 percent of land area on Earth is covered with glacial ice, including glaciers, ice caps, and the ice sheets of Greenland and Antarctica. Glacierized areas cover over 15 million square kilometers (5.8 million square miles). Glaciers store about 75 percent of the world's fresh water.*

It seems incredible that so much water in the form of ice is comprised of two gases.

*https://nsidc.org/cryosphere/glaciers/quickfacts.html

45

Hydrogen has the atomic number 1 and is the lightest element on the Periodic Table. Oxygen has an atomic weight of 15.99g/mol. Water has a molecular weight of water = 18.01528 g/mol. It is said water comprises 2 parts hydrogen and 1 part oxygen. So the total molecular weight of water would be 1+1+15.99= 17.99g/mol. Not exact but close enough.

Whenever hydrogen reacts with oxygen an immense amount of heat, light and sound is always generated yet one can never know exactly how much mass of the gases is lost generating those qualities. So how then is it possible the molecular weight of water can equate to 2 part hydrogen and 1 part oxygen when the mass of gases would have been lost to heat, light and sound?

It seems very reasonable to consider water is not comprised of hydrogen and oxygen.

46

The ‘Burning £10 note trick’ demonstrates that water is not generated from the combustion of alcohol in air. Firstly, take a paper £10 note and soak it in alcohol. After leaving it for awhile to soak, withdraw the note from the alcohol with tongs and set it alight.

What is observed?

The note is engulfed in flames that rise up only to extinguish and leave the note undamaged from the combustion.

It is claimed the combustion of the alcohol in air (oxygen) produces heat, light, carbon dioxide and water. The temperature the alcohol burns at is too low to evaporate the water, so the water protects the note from burning.

However this understanding is faulty rationale as essentially what really happens is as soon as the paper bank note is soaked in alcohol, a percentage of the water content within the alcohol is absorbed into the note and this protects the note from burning.

Once removed from the alcohol and exposed to air, the alcohol begins to evaporate. These vapours are then ignited and flames and charring is observed moving up the bank note.

The bank note remains intact.

The water that protected the bank note from being burned originated from the alcohol not from the combustion of the alcohol (hydrogen) in the presence of oxygen in the air.

47

Task: - Place a glass beer bottle in a fridge and leave it. Then one evening, when you are settled down and want to enjoy an ice cold beer take the bottle out of the fridge and pour yourself a well deserved glass.

After awhile you will notice liquid water form on the glass beer bottle and you wonder where the hydrogen and oxygen came from to create that liquid water. What is happening is that water being already present as moisture in the air is condensing on the cold glass bottle.

Remember glass has low thermal conductivity and that, along with the warmer ambient air in the room creates the perfect conditions for condensation to form.

48

Task: - On a wet and dismal day what better way to spend an afternoon than taking a bus ride. As soon as you shake off the rain drops from your coat and sit down, look at the windows and observe just how much condensation has formed on them.

Ask yourself where the hydrogen and oxygen have come from to form the liquid water streaming down the window? What was the reaction that took place? How did the water form?

With no hydrogen and oxygen anywhere to be seen, could it simply be the warmer air mainly generated by the passengers on-board the bus, condenses on the colder windows?

49

Although hydrogen and oxygen are allegedly the components of water, it is the understanding of the author that hydrogen and oxygen cannot be bonded together by themselves alone through any reaction.

50

Hydrogen peroxide is the simplest peroxide (a compound with an oxygen–oxygen single bond). It is used as an oxidizer, bleaching agent and antiseptic. Concentrated hydrogen peroxide, or "high-test peroxide", is a reactive oxygen species and has been used as a propellant in rocketry. Its Chemistry is dominated by the nature of its unstable peroxide bond.*

The author attempted to electrolyse a solution of hydrogen peroxide and was unable to obtain anything.

Given this information it seems incredulous that a substance allegedly so rich in hydrogen and oxygen, just like water is said to be, would require the presence of an electrolyte to produce hydrogen and oxygen gases when electrolysed.

In the author's understanding, hydrogen peroxide is water that contains only high levels of dissolved oxygen originating from its manufacture. This means hydrogen peroxide is a non-polarised chemical substance and this would explain why hydrogen peroxide cannot be electrolysed. The only time hydrogen peroxide can be electrolysed is when an electrolyte is added.

This is yet another example where the presence of an electrolyte is crucial in the production of any hydrogen and oxygen gases during electrolysis of chemical compounds in solution because the electrolyte and/or the electrode(s) are where any gas products originate from.

Again it is clear water cannot be broken down into its alleged components of hydrogen and oxygen using electrolysis.

Additionally, this is a great example to highlight the only time oxygen is contained in water is when it has been added to water.

*https://en.wikipedia.org/wiki/Hydrogen_peroxide

51

Many H2O supporters would state that along with fuel celled vehicles, water is also a tailpipe product from the combustion of a hydrocarbon fuel in conventional motor vehicles.

People think the reaction of the fuel (hydrogen) and air (oxygen) having been burned in the combustion chamber produces the water.

However, it is the understanding of the author that water is part of the fuel.

Now many people would disagree and state this cannot be so because diesel and petroleum are immiscible in water, so the water has to be a product of the combustion.

Well, although generally regarded as hydrophobic, many petroleum hydrocarbons are actually soluble in water.

The water associated fraction (WAF), sometimes termed the water-soluble fraction (W.S.F.) for example, is the solution of low molecular mass hydrocarbons naturally released from petroleum hydrocarbon mixtures in contact with water.

Therefore, it is plausible to accept that water is a constituent of many hydrocarbons. It is the author's understanding that during the production of many fuels, water is saturated to the point where the water cannot 'hold' or be saturated by any more fuel.

This understanding would explain why fuels such as petrol are immiscible with water because the water cannot contain anymore processed fuel rendering the 'fuel solution' immiscible.

52

The term hydrocarbon in organic Chemistry is an organic compound consisting entirely of hydrogen and carbon. The prefix hydro- means 1. water; relating to water and 2. (chem.) combined with hydrogen. The word hydrogen originates from late 18th century, coined in French from Greek hudro- ‘water’ + -genēs ‘former’.

From this information hydrocarbon means carbon combining with hydrogen in the author’s understanding a hydrocarbon is a carbon based fuel combined with water, as the prefix hydro also refers to water.

53

In support of point 52, whenever hydrogen is produced, water is always present within the production of the gas. This is the reason why the understanding of the term hydrocarbon has been misinterpreted and ought to relate to ‘water and carbon’ rather than ‘hydrogen and carbon’.

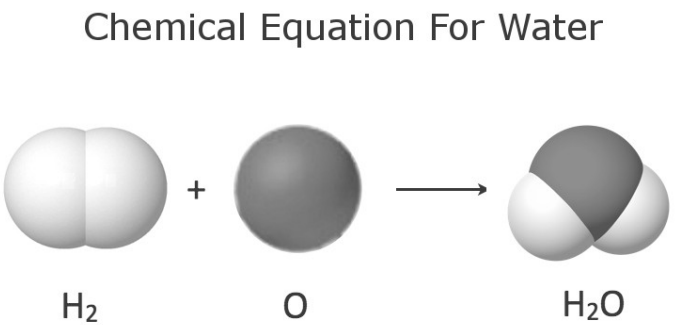
54

The author understands that without reaction, any substance that shares characteristics of water must by virtue of those characteristics contain water. For example, alcohol can be shown to share numerous characteristics of water such as fluidity, self-levelling, meniscus forming, can undergo surface tension and undergo certain processes like boiling and evaporation.

Therefore an alcohol contains water and any fuel that shows characteristics of water is no different.

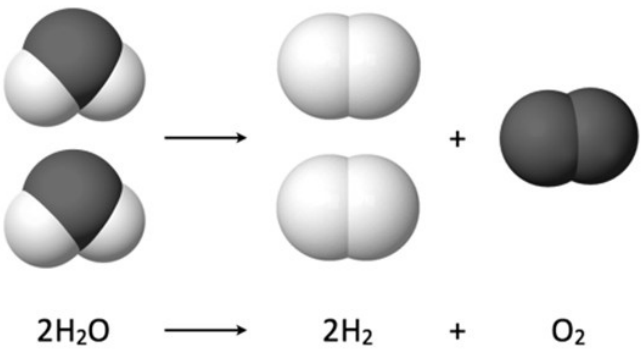
55

Over the years, the symbol for water has consistently been H2O with 2 hydrogen atoms bonded to 1 atom of oxygen.



Until recently however, a new understanding has forced a change to that iconic symbol.

H2O supporters now consider water to exist as 2H2O as can be shown in the diagram below outlining the decomposition of H2O.



Notwithstanding an attempt to criticise the creators of this new understanding, any reaction shown by a chemical equation should accurately reflect reality. For example, we are told water comprises 2 parts hydrogen and 1 part oxygen so the chemical symbol must always be H2O.

If water actively takes part at the start of a reaction or, is produced after the reaction has taken place, any chemical equation of the reaction should always reflect this. So given this, how then is it possible that we can retrace the new equation to end with something unlike H2O?

If we attempted this, we should arrive at the following….

$$2H_2 \quad + \quad O_2 \longrightarrow \quad 2H_2O_2$$

However water being 2H2O2 is a far cry from the H2O we are all familiar with. It is clear a conflict and some confusion exists surrounding the chemical symbolism of water which only arises because water is not H2O.

56

If water is comprised of 2 parts hydrogen and 1 part oxygen the chemical formula has no reason to change; the science of Chemistry might develop over time but the water itself, does not. So any chemical formula containing water should always remain consistent.

If variations of formula do occur as seen in reason 55, it is the understanding of the author the change is to invigorate the science itself to avoid stagnation. People can ‘think’ chemistry is developing and mankind is progressing, whereas in reality, the true nature of water and every other element or compound, remains unchanged.

57

If the 'electrolysis of water' was true and water could be split into hydrogen and oxygen, then it would follow if more water was added the yield of gas products i.e. hydrogen and oxygen, would increase. However, this is not the case as one has to increase the amount or concentration of electrolyte to increase the rate of gas production.

It seems the concept of the 'electrolysis of water' is one that misguides others into thinking gases originate from the water when in fact, they do not.

Finally, it could well be the case the concept of the ‘electrolysis of water’ merely refers to electrolytes in solution.

58

The Law of Conservation of Mass was introduced by Antoine Lavoisier in 1789 (pictured above) and in terms of chemical reactions, the law states that mass, in an isolated system is neither created nor destroyed by chemical reactions or physical transformations. This understanding is analogous to the Law of Conservation of Energy.

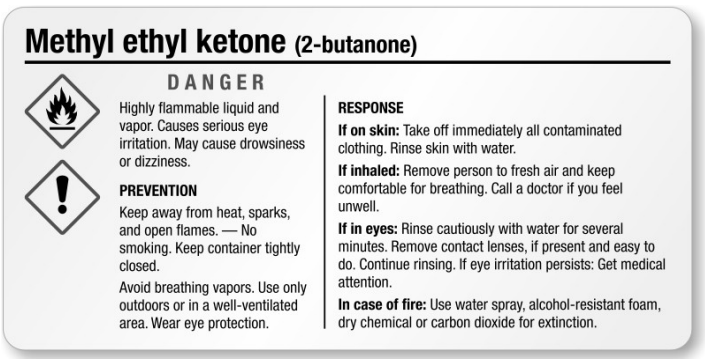
Appertaining to water, Lavoisier's law simply affirms that if water (in one form or another) is present at the start of a reaction, water will be present at the end of a reaction, in one form or another; if water goes in, water must come out.

So it seems the very properties of water are dictated by the very law Lavoisier conceived: Water can never be created nor destroyed - water can only be changed from one form to another e.g. liquid to solid.

From this, water cannot comprise hydrogen and oxygen and water cannot be brought about solely from a reaction between hydrogen and oxygen.

59

HHO Gas Torches are used in many applications where a small precision hot flame is required for welding, brazing etc. The production of hydrogen gas from the electrolytic process is usually supplemented by a ‘booster’ in the form of a flammable vaporised gas, such as methyl-ethyl ketone to generate more hydrogen.



If it was truly the case hydrogen and oxygen originated from water alone, then one would merely add more water into the equipment rather than supplement the gas from the electrolytic process with a flammable substance.

60

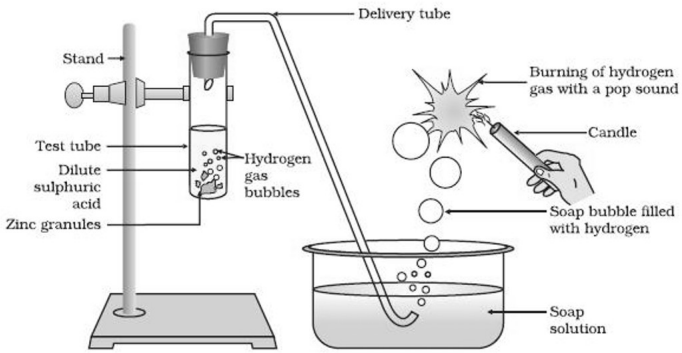
With further reference to the alleged ‘electrolysis of water’ it is without doubt there exists no product on the market where water can be broken down into hydrogen and oxygen thus demonstrating conclusively to any user, the water is being ‘split’.

Such a machine could be called a ‘water splitter’ if it was possible.

61

Sir Henry Cavendish was the first person to isolate hydrogen in the late 18th century. Cavendish found that a definite, peculiar, and highly inflammable gas, which he referred to as "Inflammable Air" was produced by the action of certain acids on certain metals. Cavendish later went on to claim hydrogen had originated from water and consequently published a paper on the production of water by the reaction of hydrogen and oxygen.

However we must bear in mind Lavoisier's Law of Conservation of Mass and remember that many acids are diluted in water.



Furthermore, we know that water decomposes metals and we know water was already present in the metal/acid reaction, so it is more than likely amounts of water in one form or another would have been present along with the hydrogen gas - just like water is present in your gas pipe.

So when the hydrogen was later burned water would have been 'released' to then condense on the sides of a cooler glass container. Moisture in the air may also have played a crucial role in the production of water.

Although these variables were overlooked at the time when Cavendish burned the gas, it is the author's understanding that Cavendish failed to accurately determine where the water came from during his experiments with acids/metals.

Additionally, when Cavendish burned hydrogen in the presence of oxygen and produced water, he did not test the ‘produced water’ to confirm the 'produced water' was indeed ‘new’ water; he only assumed it was. Nor did Cavendish test for the presence of hydrogen and oxygen in his newly ‘produced water’.

How Cavendish came to realise water to be comprised of hydrogen and oxygen is absolutely absurd given water could have originated from other sources like the acid or even from the moisture in the air.

62

A common demonstration to produce hydrogen gas is to heat a metal whilst steam is passed over it. For example, magnesium is placed in a boiling tube where steam is passed over the metal and it is heated. Once the magnesium reacts, the gas generated is collected and is positively identified to be hydrogen.

In this experiment, many would consider hydrogen had been synthesised from the water yet it is only the magnesium that decomposed. The water merely changed state.

So how can it be that hydrogen originated from a substance that does not show any clear sign of decomposition, only a change in form?

It is only reasonable to consider hydrogen originated from the decomposing magnesium metal and not the water.

63

During the industrial production of hydrogen, methane gas undergoes a steam reforming process where the gas and steam are subjected to temperatures between 700 – 1100 °C. The temperatures steam is exposed to during this process far exceed its critical temperature.

So in the author's understanding once the steam has been exposed to such high temperatures the steam cannot return to its prior state of liquid water if the same pressure the steam is exposed to, is sustained.

This can explain how water can exist alongside gas supply pipelines as the gas/water mix remains under pressure all the while it remains in the pipe work that leads to any gas appliance.

64

Both Cavendish and Lavoisier carried out similar experiments to produce water from the reaction between hydrogen and oxygen.

Using apparatus as pictured, air can be evacuated from the glass balloon and a vacuum held. Oxygen can then be introduced through a pipe at the top to fill the chamber. Hydrogen can be slowly introduced and ignited by an electrical spark between electrodes fitted inside the chamber.

Although both Cavendish and Lavoisier reported to have produced liquid water, it must be stated that such a reaction between hydrogen and oxygen in their experiments does not prove beyond any doubt water is made of hydrogen and oxygen especially when one considers the following points.

1. Given our knowledge of superheated steam, both Cavendish and Lavoisier could not have ensured the chamber was free of moisture which could have entered the chamber along with the hydrogen and/or oxygen.

2. When pulling a vacuum inside a glass balloon the temperature inside would have decreased. Remembering also that glass has a low thermal conductivity rating it is commonplace for condensation to occur in an environment that contained warmer ‘air’.

3. See point 73 – water forming where no hydrogen is present.

4. Hydrogen provides a source of heat and light during its combustion. Oxygen only intensifies that heat and light. In this reaction, hydrogen could be seen as a catalyst to change the properties of oxygen to possibly form water.

5. Lavoisier's Law of Conservation of Mass with regard to water.

65

TASK - During a cold morning whilst walking, using your diaphragm inhale deeply and then maintain a careful eye on the fine water vapour produced in the air whilst exhaling.

One will realise that warm exhaled air in contact with colder air will produce moisture as either, the colder air will evaporate upon contact with the warmer air or, the warmer air will condensate upon contact with the colder air.

Or perhaps both occur simultaneously and in combination with each other. In either case hydrogen and oxygen were not generated to create the moisture.

66

Quora is a place to gain and share knowledge. It is an online platform used to ask questions and connect with people who contribute unique insights and provide quality answers.

The author asked the Quora community – when electrolysing a potassium hydroxide solution, how can we know the gas products come from the water and not from the electrolyte?

A number of responders replied and the best method to identify the source of the gases was to use isotopic markers.

The use of a radio active substance would literally ‘stain’ either the electrolyte or the water allowing a substance to be traced. However this method is unreliable as cross contamination would likely spoil any findings and any results would be questionable.

There is no reliable way to conclusively identify the origin of the gases produced during the electrolysis of potassium hydroxide (KOH), let alone any other electrolyte.

So it is clearly incomprehensible to claim gas products come from water when nobody can ever provide conclusive proof to support the claim.

67

One of the main problems Cavendish encountered when allegedly producing water from the reaction between hydrogen and oxygen is that Cavendish himself, could not determine precisely whether the resultant water contained only oxygen, after all it would have been a likely possibility because the hydrogen had ‘burned off’.

Moreover, Cavendish at first considered hydrogen to be either pure ‘phlogiston’ or phlogisticated water in keeping with the Phlogiston theory at the time.

In any case, it would appear that not only did Cavendish have the problem of verifying the components of the ‘produced’ water, but other people conducting the same experiment would have faced the same dilemma too.

68

Given all that has been disclosed thus far, it seems very clear the great chemists of bygone days such as Cavendish and Lavoisier were not that great afterall and even to this very day, nobody can conclusively demonstrate water to comprise hydrogen and oxygen.

69

What set Lavoisier apart from other notable chemists at the time was he employed a system of weights and measures that allowed him to calculate the end products of a reaction.

Lavoisier would later become the father of stoichiometry; a systematic study that allows chemists to easily contrive the results of experiments and enable them to show the presence of an element before and after a reaction even if the element was not present at all.

So for example, when Lavoisier passed steam (allegedly hydrogen and oxygen) over a spiralled strip of iron he produced only hydrogen gas. But because Lavoisier did not produce any oxygen in this experiment, he simply factored the oxygen in by means of calculation based upon the weights of the substances involved.

In many ways Lavoisier contrived the results to show the presence of oxygen in water when in reality, there is no oxygen in water.

70

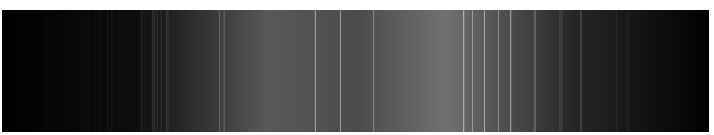
The emission spectrum of a chemical element or chemical compound is the spectrum of frequencies of electromagnetic radiation emitted due to an atom or molecule making a transition from a high energy state to a lower energy state.

The photon energy of the emitted photon is equal to the energy difference between the two states. There are many possible electron transitions for each atom, and each transition has a specific energy difference. This collection of different transitions, leading to different radiated wavelengths, makes up an emission spectrum.

Each element's emission spectrum is unique. Therefore, spectroscopy can be used to identify the elements in matter of unknown composition.*

The spectral lines of Hydrogen can be seen below:-

The spectral lines of Oxygen can be seen below:-



However although one would think the spectral lines of water would be an amalgamation of the spectral lines above, the only time spectroscopy can be used to study water is when matter has been absorbed in or added to the water.**

So it appears spectroscopy is limited as it cannot be used to identify hydrogen and/or oxygen in water and can only identify the impurity or matter added to the water.

Again this is further evidence to support the fact hydrogen and oxygen do not constitute water as there is no method to determine hydrogen and oxygen constitute water without having to add hydrogen and oxygen to water in the form of matter.

*https://en.wikipedia.org/wiki/Emission_spectrum
**https://en.wikipedia.org/wiki/Electromagnetic_absorption_by_water

71

Given what we know about flame colours, there is no single, defined and generally accepted flame colour of hydrogen.

Lots of confusion surrounds one of the most basic features of this plentiful gas, which is very odd. It would be very reassuring if there existed overwhelming consensus regarding hydrogen's flame colour and yet, this is not so.

Hydrogen it appears, can burn with a pale blue flame reminiscent of natural gas or perhaps, hydrogen can also burn with orange flames as witnessed by the Hindenburg airship disaster of 1937. It is also claimed hydrogen burns with a pretty purple/lilac flame.*

To highlight further the confusion surrounding the flame colour of hydrogen, we might read the following, taken from an abstract written by W.F. Barrett entitled, On the Colour of a Hydrogen Flame:-

"A correspondent to your last number has troubled himself to propound an elaborate theory, to account for the blue tinge which he states is always exhibited by the flame of hydrogen.

*There are also several text-e-books on Chemistry which assert that hydrogen burns with a characteristic faint blue flame. It is easy to prove, however, that the flame of pure hydrogen has no blue tinge whatever. The blueness so frequently associated with the flame of hydrogen is really due to the presence of sulphur as is shown in a little paper I published in the Philosophical Magazine for November 1865."***

It is very clear if hydrogen is a product originating from water alone the gas would always burn with the same colour flame, even after being cleansed. This is never the case.

*https://www.quora.com/Is-hydrogen-colourless-How-would-it-burn
**https://www.nature.com/articles/005461d0

72

It is understood oxygen is usually garnered at the positive electrode (anode) during the alleged ‘electrolysis of water’.

However it was found by the author during the electrolysis of Sodium Chloride solution that it is possible for a compound gas to be harvested and collected from a decomposing anode electrode. This compound gas, when ignited showed characteristics reminiscent of both hydrogen AND oxygen; a vigorous reaction took place whereby a squeaky pop was heard along with an intense glow.

Given it is possible to produce two seemingly different gases at one electrode, proves electrolysis does not ‘split water’ into the alleged components of hydrogen and oxygen.

73

TASK – If you have access to a device with an internet connection, research bleed air with regard to aircraft, where you will discover how water can form at high altitudes without hydrogen and oxygen being present.

When an aircraft flies at very high altitudes cold temperatures are experienced and one method to prevent ice forming on the leading edge of an aircraft's wing, is to redirect very warm compressed air from the turbofan (engine) to the inside of the wings.

As a consequence of heating wings internally, ice water droplets condensate on the wing's outer leading edge. It is very clear from this example that liquid water can form even at high altitudes where there is no hydrogen and oxygen and the air is very dry with a relative humidity with respect to ice of less than 1 per cent.*

* https://www.metoffice.gov.uk/binaries/content/assets/mohippo/pdf/1//1955_murgatroyd_goldsmith_hollings.pdf

74

Before Lavoisier introduced his theory of oxidation, the Phlogiston theory was the popular theory of the time to explain combustion and corrosion. The four classical elements earth, air, fire and water underpinned the theory.

So, if one supported the theory of phlogiston one would consider water to be just that, water.

However, it is the understanding of the author Lavoisier and possibly other notable chemists of the day were eager to replace the widely accepted Phlogiston theory. Chemists at the time, along with other groups, wanted to destroy the bond humans have with their natural 'selves'. Lavoisier's theory of oxidation satisfied this purpose as it placed Oxygen at the heart of all four elements; air, fire, earth and of course water.

Soon after, water was to become comprised of hydrogen and oxygen or H2O and cease to be an element in its own right.

Yet it can be demonstrated aspects of Lavoisier's theory of oxidation are flawed as in some cases moisture helps form an 'oxide' and not oxygen. Moreover, parts of the Phlogiston theory still hold true to this very day. For example, when a substance is burned, a component of the substance can migrate and become 'absorbed' by another substance.

This idea formed the entire basis of the Phlogiston theory and forms the basis of all chemical reactions of this nature.

75

The most popular method for measuring dissolved oxygen in water samples is by using dissolved oxygen (DO) meters and accompanying sensors. However one cannot use such a device straight out of the box to take any measurement of dissolved oxygen in a water sample.

One would have thought devices would be factory set to detect the presence of oxygen but this is not the case (see reason 76). One must always calibrate any device to detect dissolved oxygen in water and in so doing one is manually defining the limitations of the instrument; informing the device of the parameters that need to be factored in when determining dissolved oxygen levels.

It is here that one needs to ask oneself, does a DO meter actually detect dissolved oxygen or merely an apparent characteristic of dissolved oxygen in the absence of oxygen? (see Winkler test - reason 25)

In the author's understanding, such practice of calibration clearly demonstrates the latter is the case and highlights the devices inability to detect the actual gas present.

76

Following on, no device directly detects dissolved oxygen (DO) in water samples.

The author understands, any amount of dissolved oxygen measured by any device is merely calculated through the careful manipulation of known variables. Having gained knowledge of the properties of dissolved oxygen in laboratory samples under different conditions, manufacturers of such devices have been able to develop an array of different sensors, each utilising a specific feature that is found to exist with dissolved oxygen samples.

For example, concentrated levels of dissolved oxygen in water make water more acidic thereby lowering levels of pH.

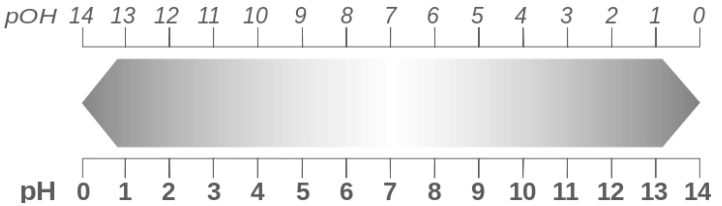
Given this known variable it is possible for manufacturers to develop a device that can determine a figure or level of dissolved oxygen based on pH levels and not directly from the actual amount of dissolved oxygen contained in a water sample.

So going on from the above, even though one can purchase a DO meter one is essentially purchasing a pH meter.

77

pH testing is a method for determining the acidity or alkalinity of a substance dissolved in water and is based on a scale between 0-14. pH stands for *'potential hydrogen*' and from this, a pH value determines either the potential hydrogen within a substance or the potential oxygen within a substance. Water, with no impurities has a neutral pH of 7.

This tells us water contains no hydrogen and no oxygen.



78

Water always being neutral reflects a uniformly stable substance and pH levels only change due to the presence of impurities in water. For example, a water sample may have a pH of 7 but when Acetic acid is added to the sample, the pH value will lower to say, 3. In this respect the pH value only relates to the acid and not the water as any water will always remain neutral.

So any potential hydrogen and/or potential oxygen measurement ONLY relates to the impurity or substance added to the water and not the water itself.

79

This section has been conveniently left open so you, the reader can gather your thoughts and ponder whether you really think water comprises hydrogen and oxygen. Or, whether you think like the author and consider water to be water. But just to offer some additional help, as far as the author is aware, there is no test for the presence of hydrogen in water that is free of impurities.

Although there are a number of tests to determine the amount of oxygen in water like the Winkler Test (see 25), there is no test to determine the amount of hydrogen. This is only because there is NO hydrogen in water.

80

Water historically and also in religious thought, has been considered to be an actual element existing alongside earth, air and fire; one of the classical elements in ancient Greek philosophy. Although it was later that Aristotle would add a 5th element Aether.

In the Asian Indian system Panchamahabhuta, and in the Chinese cosmological and physiological system Wu Xing water is also considered an element.

Vedic scripture within Hinduism also details a system consisting the pancha mahabhuta, or "five great elements"; bhūmi (earth), ap or jala (water), tejas or agni (fire), marut, vayu or pavan (air or wind) and vyom or shunya (space or zero) or akash (aether or void).

Within the early Pali literature of Buddhism, the mahabhuta ("great elements") or catudhatu ("four elements") are earth, water, fire and air. In Bön or ancient Tibetan philosophy, the five elemental processes of earth, water, fire, air and space are the essential materials of all existent phenomena or aggregates.

The Islamic philosophers al-Kindi, Avicenna and Fakhr al-Din al-Razi connected the four elements with the four natures heat and cold (the active force), and dryness and moisture (the recipients).

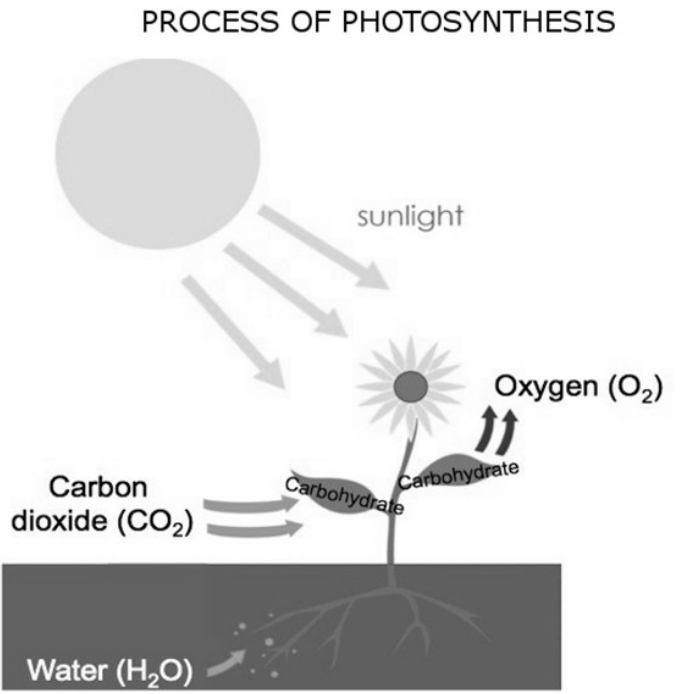
Japanese traditions use a set of elements called the 五大 (godai, literally "five great"). These five are earth, water, fire, wind/air, and void.

Western astrology uses the four classical elements in connection with astrological charts and horoscopes. The twelve signs of the zodiac are divided into the four elements: Fire signs are Aries, Leo and Sagittarius, Earth signs are Taurus, Virgo and Capricorn, Air signs are Gemini, Libra and Aquarius, and Water signs are Cancer, Scorpio, and Pisces.

It is clear water has and always will be considered an elemental substance in areas of human existence to the extent where even modern witchcraft incorporates water as one of the five elements that appear in most Wiccan traditions.

81

Photosynthesis is the process by which plants, some bacteria and some protistans use the energy from sunlight to produce glucose from carbon dioxide and water. A plant has the ability to convert water and carbon dioxide to oxygen. Essentially the plant utilizes a catalyst i.e. chlorophyll and the energy from the sun to aid in the decomposition of water.

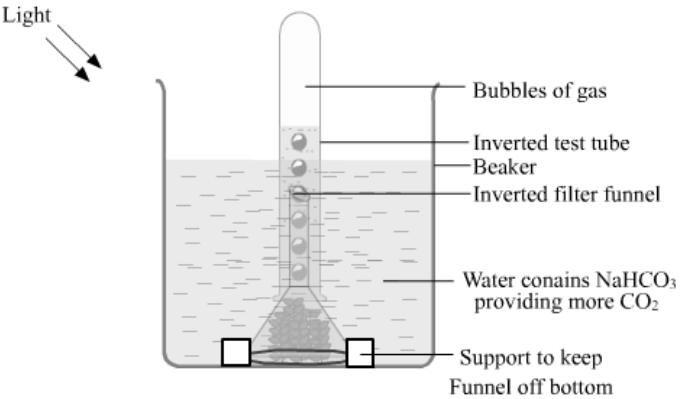


While the chlorophyllic reaction is said to produce oxygen gas, it is not said to produce hydrogen in a gaseous form.

82

To show water is not comprised of oxygen one only has to look at how photosynthesis is demonstrated*.

One method to obtain oxygen from a plant involves applying light to a pondweed placed in a glass cylinder filled with water as shown below.



In the photosynthesis demonstration shown it is recommended to add sodium bicarbonate to the water which is said to provide a source of carbon dioxide required for the process to occur.

The author has carried out this demonstration and obtained oxygen.

However many people fail to recognise Sodium Bi-carbonate to be a source of oxygen having the chemical formula NaHCO3 where 3 Oxygen exist to 1 Sodium, Hydrogen and Carbon.

The author concludes that a plant will only release oxygen when the plant is given oxygen and photosynthesis does not occur in the natural environment. This demonstration is contrived.

*http://www.saps.org.uk/secondary/teaching-resources/190-using-cabomba-
to-demonstrate-oxygen-evolution-in-the-process-of-photosynthesis-

83

We are told photosynthesis is a real biological process and all of plant life utilises this mechanism to provide animals the oxygen required for their own respiration. If plants are said to give off oxygen, then plants must be able to convert water into hydrogen and oxygen.

Yet no single person can demonstrate beyond any doubt whatsoever a plant actually converts water into hydrogen and oxygen.

84

Given the reactive nature of hydrogen and the physical properties of oxygen, nobody can run an engine, whether a rocket, train, car, motorcycle or even a lawnmower with just water. Similarly, nobody can fill up their fuel tank with water and expect the water to fuel the vehicle.

This demonstrates water is not comprised of hydrogen and oxygen.

85

The Wikipedia entry, Water-fueled cars contains a sub heading entitled Extracting energy from water, where it states:-

> "According to the currently accepted laws of physics, there is no way to extract chemical energy from water alone."*

This statement clearly supports the view that water does not comprise hydrogen and oxygen.

*https://en.wikipedia.org/wiki/Water-fuelled_car

86

According to the currently accepted laws of physics, there is no way to extract chemical energy from water alone. Additionally, water itself is regarded to be highly stable and allegedly contains very strong chemical bonds. Its enthalpy of formation is negative (-68.3 kcal/mol or -285.8 kJ/mol), meaning energy is required to break those stable bonds and allegedly, separate water into its elements.

However, there are no other compounds of hydrogen and oxygen with more negative enthalpies of formation than water, meaning no energy can be released when water is decomposed into its alleged parts of hydrogen and oxygen.

In simpler terms, a great deal of ‘energy’ is required to break water’s stable bonds but no energy can be released by its decomposition.

87

In 2002, the firm Hydrogen Technology Applications patented an electrolyser design and trademarked the term "Aquygen" to refer to the hydrogen oxygen gas mixture produced by the device. Originally developed as an alternative to oxyacetylene welding, the company claimed to be able to run a vehicle exclusively on water, via the production of "Aquygen".

At present, the company no longer claims it can run a car exclusively on water.*

This information supports the fact water cannot be used as a fuel and does not therefore comprise hydrogen and oxygen.

*https://en.wikipedia.org/wiki/Water-fuelled_car#Stanley_Meyer's_water_fuel_cell

88

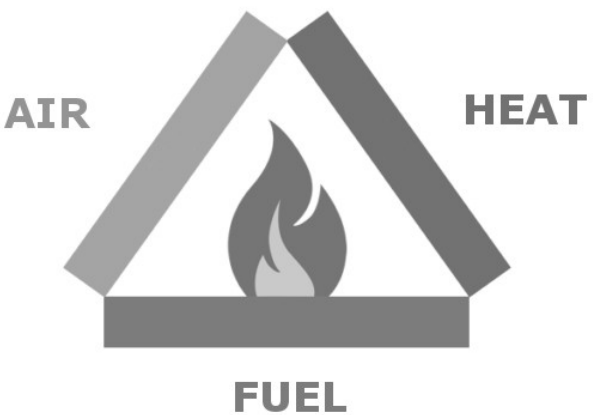
Thermal decomposition, also called thermolysis, is defined as a chemical reaction whereby a chemical substance breaks up into at least two chemical substances when heated. At elevated temperatures water molecules allegedly split into hydrogen and oxygen.

So for example, at 2200 °C about three percent of all H2O molecules are dissociated into various combinations of hydrogen and oxygen atoms, mostly H, H2, O, O2, and OH. Other reaction products like H2, O2 or HO2 remain minor. At the very high temperature of 3000 °C more than half of the water molecules are decomposed, but at ambient temperatures only one molecule in 100 trillion dissociates by the effect of heat.

One question to ask is, how can water split into hydrogen and oxygen at such high temperatures and not combust?

Most should be familiar with the fire triangle that details the essentials needed for combustion to occur.

So returning to the thermal decomposition of water, **fuel** is present by the dissociated hydrogen, **heat** is present given the temperatures required to split the water i.e. 3000 °C and **air** is also present in the form of dissociated oxygen.



With all the conditions of the fire triangle met, it really is ridiculous to think water can be thermally decomposed into hydrogen and oxygen without combustion ever occurring.

89

95% of the world's production of hydrogen gas is produced from methane through the steam reformation process. A steam reformer operates at temperatures between 700-1100°C. Water electrolysis is said to produce hydrogen gas at operating temperatures between 50-80°C.

Taking these different temperatures into account, if hydrogen was a constituent of water, it would be more economical to obtain hydrogen from the electrolytic process rather than a steam-reforming process as hydrogen can be produced using less energy. But this isn't the case.

In the author's opinion electrolysis is not utilized to manufacture hydrogen on a mass scale because hydrogen originates from substances like methane and not water.

90

To help reduce hydrogen production costs companies are always looking into cheaper methods to produce hydrogen. One such area gaining interest is the use of bio-mass fuels (example pictured below).

Biomass fuels are organic materials produced in a renewable manner. Two categories of biomass fuels, woody fuels and animal wastes, comprise the vast majority of available biomass fuels.

Researchers from the University of Hawaii mixed wood sawdust with a corn starch gel to create a viscous paste which then passed, along with superheated steam, through a reactor over a carbon bed catalyst. The carbon bed catalyst in the reactor operated at about 650°C causing tarry vapours to react with water, producing hydrogen, carbon dioxide, and some methane with a trace of carbon monoxide.

It is quite clear from the above that this kind of steam reforming process is more cost effective compared to current commercial hydrogen production methods where temperatures in the steam reformers are nearly doubled.

Yet although hydrogen can be produced at lower temperatures it has to be remembered that water can only be satisfactorily split into its alleged components i.e. hydrogen and oxygen at temperatures of around 3000°C.

The mere fact hydrogen can be produced at lower temperatures clearly shows hydrogen cannot originate from water.

91

The chemical name for water is dihydrogen monoxide (H2O) – two parts hydrogen to one part oxygen. However, if one was to impregnate water with Tritium – an isotope of hydrogen one would produce tritium oxide (T2O or 3H2O), tritated water or super-heavy water. Tritium's chemical symbol T2O is similar to H20 in format yet this similarity is not reflected in the chemical names of these two waters; dihydrogen monoxide is dissimilar to Tritium Oxide.

So we have to ask whether water is dihydrogen monoxide? Or could it be Hydrogen Oxide? Perhaps water is even something else?

Whatever the case, there is clear confusion within the science of Chemistry appertaining to its application of chemical names and symbols.

92

The name oxygen was coined in 1777 by Antoine Lavoisier, whose experiments with oxygen helped to discredit the then-popular Phlogiston theory of combustion and corrosion. Its name originates from the Greek words oxys, "acid" meaning ”sharp” and genes, "producer", literally "begetter".

At the time of naming, it was mistakenly thought that all acids required oxygen in their composition.* However, if we look at the properties of oxygen it can be clearly observed that oxygen fortifies or intensifies the characteristics of another element. For example, oxygen intensifies a burning flame, oxygen can help a metal sustain its metallic lustre, oxygen when inhaled, is “five or six times as better as common air” (words from Joseph Priestley).

From this, oxygen would only strengthen a property of an acid, in this case the ‘sharpness’ and not create it.

So it can be taken oxygen was named incorrectly because it was not an acid producer; the acid was already present before the addition of oxygen.

To reinforce this understanding, sulphuric acid has the chemical symbol H2SO4 and contains three elements hydrogen (H), sulphur (S) and oxygen (O).

The quantity of each element is represented by a number following the element's chemical symbol. If a number does not follow a chemical symbol, it is taken the amount of the chemical element present is 1.

It is clear sulphuric acid contains more oxygen than hydrogen and sulphur put together as we can see 4 parts oxygen, 2 parts hydrogen and 1 part sulphur.

What is important here is that the sharpness most likely comes from the sulphur and the oxygen merely intensifies that quality of the element.

So one part of H2O, oxygen has been dubiously named, let's have a look at the other part, hydrogen, to see if doubt also exists there.

The word hydrogen originating from late 18th century was coined in French from the Greek word hudro "water" and genēs meaning "begetter". Hydrogen essentially means 'water former' as it was observed water was always produced when the gas burned.

At the time of its discovery in 1766, Cavendish referred to hydrogen as "inflammable air" as it was the only gas at the time that was flammable. Given what has been laid bare in prior reasons, it is the author's understanding that hydrogen could have been more appropriately named "pyrogen" to reflect the gases property of combustibility – pyro from the Greek word πυρ (pyr), meaning "fire" and genēs meaning "begetter".

Interestingly though, Cavendish had considered hydrogen to be phlogiston and it is the author's view there was a growing agenda to destroy the Phlogiston theory and by naming hydrogen after its combustible property would only serve to reinforce the survival of the theory.

Regardless, water is allegedly made up of two components that have been incorrectly named and is another reason why H2O can never be water.

*https://en.wikipedia.org/wiki/Oxygen#Etymology

93

TASK: - Have you ever recalled the times when the weather was wet and dreary and after a few hours, clouds cleared to reveal glorious sunshine? If you watch closely you will notice the puddles of water on the ground start to disappear rapidly before your very eyes.

There is no need for magic, deception or even some kind of fantastical reaction. All we are witnessing is the fundamental process of evaporation; a liquid transitioning to its gaseous state due to the presence of solar energy.

No hydrogen or oxygen is ever known to be produced from this process.

94

The following is an entire comment by a YouTube user who considers water to comprise hydrogen and oxygen. In the comment the user outlines the weight of the gases required to create a specific amount of water.

"*I think you have made the assumption that the pressures in the hydrogen and oxygen cylinders are the same, which I don't think is correct.*

If they were identical, then the mass of oxygen should be about 16 times that of the hydrogen, as this is the ratio of the molecular weights. As the mass ratio is only about 3.4, it is worth calculating the theoretical gas pressures in the two cylinders.

You can do it using the equation of state of an ideal gas, but I prefer to use one set of values from it that we were taught, and that is easily remembered: the gram-molecular weight of any gas occupies 22.4 litres at STP.(standard temperature and pressure, 0deg.C and 1 bar pressure).

We won't correct for ambient temperature, as it will be the same change for both. For the hydrogen, of molecular weight 2, the 3,500g would occupy 3500/2 X 22.4 = 39200 litres. As this is in a 50 litre container the pressure must be 39200/50 = 784 Bar or 784 times Atmospheric pressure or 11525psi. This seems a reasonable max. pressure.

For the oxygen, of molecular weight 32, the 12000g would occupy 12000/32 X 22.4 = 8400 litres. As this is in a 50 litre container the pressure must be 8400/50 = 168 Bar or 168 times Atmospheric pressure or 2470psi.

This seemed low compared to the hydrogen pressure, but then I noticed on one of the websites that oxygen is not normally stored at higher than 200 Bar for safety reasons, so again, this looks a reasonable calculated value.

I think this explains the odd answer that you got! I reckon you need 1 cylinder of hydrogen and 2.33 cylinders of oxygen to give 31.46kg of water."

REPLY: “OK, take 1 cylinder of hydrogen and 2.33 cylinders of oxygen as you state and show us 31.46kg of water please, a video demonstrating you creating this amount of water would be fab!!“

It is clear water is not a hydrogen and oxygen compound because nobody has ever created a specific weight of water from the calculated and specified weights of hydrogen and oxygen and vice versa.

95

One of the author’s experiments consisted of collecting hydrogen gas from the electrolysis of sodium hydroxide.

As hydrogen gas is lighter than air, the author was able to insert some pieces of calcium metal into the dry bottle cap and re-seal. The bottle was left and it was observed over time the pieces of calcium whitened indicating the metal had absorbed moisture in the bottle. The gas was then burned.

The familiar ‘squeaky pop’ was heard upon combustion but the hydrogen gas had combusted almost in its entirety. Not as effective as burning ‘scrubbed’ hydrogen gas but still a noticeable difference was observed than burning the gas in the usual manner i.e. straight from the electrolytic tub.

However, the most significant aspect to this is the flame burned a uniform yellow colour throughout. From the above, it is clear that even when hydrogen gas loses any affinity with water it can still retain many of its familiar characteristics demonstrating hydrogen gas cannot originate from water.

96

Oxygen therapy is generally a treatment offered to patients with respiratory conditions such as Chronic Obstructive Pulmonary Disease (COPD). Oxygen can be delivered to a patient primarily in two ways either by using a venturi mask or cannula or nasal prongs.

It is often reported, patients who use oxygen concentrators in conjunction with nasal prongs complain of skin irritation and nasal dryness*.

Nasal dryness only occurs because oxygen has a drying effect on the nasal passages. As far as the author is concerned oxygen is a dry gas. So it is inconceivable to consider oxygen to originate from a substance that is wet, i.e. water.

*https://www.inogen.com/blog/side-effects-oxygen-therapy/

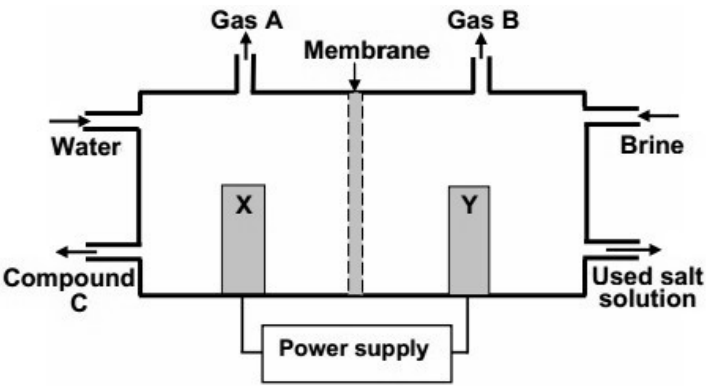
97

It is without doubt that merely having the ability to produce such an amount of information contrary to the popular understanding that water comprises hydrogen and oxygen is worthy of being considered a reason unto itself that water is not hydrogen and oxygen.

98

Processed sodium hydroxide (NaOH) when electrolysed produces hydrogen and oxygen gases which are said to come from the water. Sodium hydroxide is produced from the chloralkali process.

The Chloralkali process is an industrial process where sodium chloride is electrolysed in aqueous solution to produce chlorine and hydrogen gases and a used, unprocessed sodium hydroxide solution.



Now if one was to further perform electrolysis using the used salt solution one ought to garner hydrogen and oxygen gases.

However, this is not the case as further processing of the used salt solution would be required to enable the salt to be capable of ionic disassociation to then conduct electricity and subsequently produce hydrogen and oxygen gases.

In other words unprocessed sodium hydroxide or used salt solution directly from the Chloralkali process has to undergo further processing for it to become an electrolyte to yield oxygen and hydrogen. This means any hydrogen and oxygen harvested through the electrolysis process can only originate from the electrolyte and/or electrode(s).

99

As water does not comprise hydrogen and oxygen then it follows the symbol H2O is defunct and meaningless; H2O is merely symbolic of modern
society.

100

As far as the author is aware not one person has replicated Lavoisier's experiment with his glass balloon as described in his Traité Élémentaire de Chimie published in 1789. It is this experiment where he incorrectly determined water to comprises hydrogen and oxygen (see reason 64).

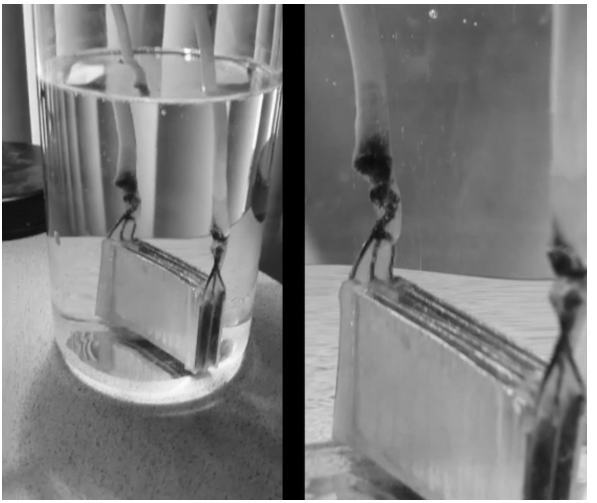
If this demonstration conclusively proved water to consist of hydrogen and oxygen, the apparatus or similar would be a familiar site within all chemistry classrooms.

Videos would also be made available showing water being produced. The author is aware of none.

101

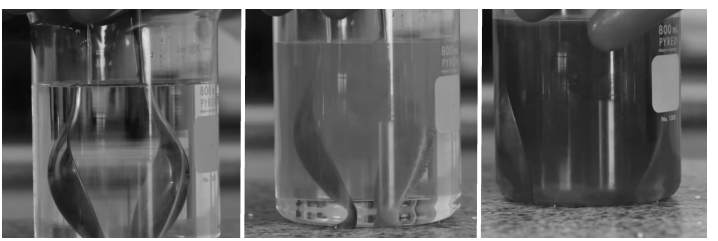
It is claimed by many people water can be ‘split’ into hydrogen and oxygen using electrolysis. In a brief 3 minute YouTube video entitled ‘35,000 volts electrolysis of distilled water’* the narrator Kevin West of WaterForFuel.com tells viewers that tiny bubbles observed to rise from conductive elements submerged in water, when electricity is said to pass, are hydrogen and oxygen from the water.

* https://www.youtube.com/watch?v=JO2MeiN7lxg



However the author understands this position to be incorrect for the following reason.

At the start of such ‘electrolytic’ process the water is clear. However given time, the water would eventually discolour due to the decomposition of the metal plates.



In the picture above, from left to right, we observe metal spoons used as electrodes in a solution of sodium chloride with 9v passed through the spoons.

Notice at different stages of the process, the water gradually discolours as the spoons are being decomposed.

From this, one can only conclude any gas bubbles observed are simply products of the decomposition and originate from materials placed in and exposed to water.

Electricity is merely the catalyst that speeds up the rate of decomposition.

So videos such as the above are intentionally deceptive as they do not show the full ‘picture’ and only show the initial stages of decomposition where gas bubbles are seen to rise and the water remains clear.

Demonstrations of water splitting are simply contrived.

102

As far as the author is aware there is no chemical test for H20. If water is a chemical substance as stated by Wikipedia, there ought to be a chemical test for it so one knows one has water in the form of 2 part hydrogen to 1 part oxygen. Alas there is none for the simple reason water is not H20.

Summary

Reasons have been presented and it is hoped they have been considered well. More research would ensure that amount would increase.

Nevertheless, the fact water cannot be created from two gases or even decomposed into the two same gases essentially lays the foundation why water can never comprise hydrogen and oxygen.

It has been stated then that nobody can produce water out of thin air. The two gases, hydrogen and oxygen alone cannot be demonstrated to create 'new' liquid water. It has also been stated that nobody can produce hydrogen and oxygen from water alone, even using simple methods such as electrolysis to allegedly break the water down.

Laws of nature dictate through the processes of creation and decomposition that water can only change form or state; water as solid ice, liquid, water as steam or vapour and water as gas. Water cannot change into two gases; hydrogen and oxygen. Water is water.

So the answer to the question posed at the beginning of this e-book, “what proof is there water is comprised of hydrogen and oxygen?” is none. There is simply no proof whatsoever water is comprised of hydrogen and oxygen; two gases existing at room temperature as gases and never as a liquid.

The reality is this: A vast amount of information only makes people ‘think’ water is H2O; hydrogen and oxygen. H2O exists merely in the imagination whereas in reality, water never changes its inherent nature to be nothing more than water (mixed with a little air).

To Close

Do you still think water is comprised of Hydrogen and Oxygen? Again, two gases existing at room temperature form a substance that exists as a liquid at the same temperature?

After reading the contents, if you think water is not H2O then thanks for taking the time to purchase and read the e-book.

If, on the other hand, you still consider water to be H2O what else is there to be said other than - thanks for taking the time to purchase and read the e-book.

But as a final word, it is hoped at least, the information within the e-book has given you the opportunity to learn more about the critique for water comprising hydrogen and oxygen.

You can now rest in the knowledge that you have finally been made aware of the existence of people who truly consider water is not hydrogen and oxygen (H2O) but water; water simply exists as water and for good reason too!

Glossary Of Terms With Conventional Understandings

Amorphous - (of a solid) not crystalline, or not apparently crystalline.

Anode - the positively charged electrode by which the electrons leave an electrical device.

Catalyst - a substance that increases the rate of a chemical reaction but which is not consumed in the reaction.

Cathode - the negatively charged electrode by which electrons enter an electrical device.

Critical temperature of a gas - is the temperature of a gas in its critical state, above which it cannot be liquefied by pressure alone.

Electrode - is an electrical conductor used to make contact with a non-metallic part of a circuit.

Electrolysis – in Chemistry and manufacturing, the decomposition of an electrolyte, either molten or in solution, into its elemental parts due to the passage of an electrical current.

Electrolyte – a polarised substance that produces ionic disassociation and thereby the capability to conduct electricity.

Electrical polarity - is a term used throughout industries and fields that involve electricity. There are two types of poles: positive (+) and negative (-). This represents the electrical potential at the ends of a circuit. A battery has a positive terminal (+ pole) and a negative terminal (- pole)

Enthalpy - a thermodynamic quantity equivalent to the total heat content of a system. It is equal to the internal energy of the system plus the product of pressure and volume.

Etymology - the study of the origin of words and the way in which their meanings have changed throughout history.

Hydrolysis - the chemical breakdown of a compound due to reaction with water.

Immiscible - of liquids, not forming a homogeneous mixture when mixed.

Oxygen concentrator - is a device which concentrates the oxygen from a gas supply (air) to supply an oxygen-enriched stream of gas.

Phlogiston - a substance supposed by 18th-century chemists to exist in all combustible bodies, and to be released in combustion.

Saturation - the degree or extent to which something is dissolved or absorbed compared with the maximum possible, usually expressed as a percentage.

Solution - a liquid mixture in which the minor component (the solute) is uniformly distributed within the major component (the solvent).

Stoichiometry - is a section of Chemistry that involves using relationships between reactants and/or products in a chemical reaction to determine desired quantitative data.

Supersaturation - is a state of a solution that contains more of the dissolved material than could be dissolved by the solvent under normal circumstances. It can also refer to a vapour of a compound that has a higher (partial) pressure than the vapour pressure of that compound.

Superheated steam is an extremely high-temperature vapour generated by heating the saturated steam obtained by boiling water.

Titration - is a common laboratory method of quantitative chemical analysis that is used to determine the concentration of an identified analyte.