September 2021

H2IL redefines their hydrogen production method From Electrolyzer To **Ion Accelerator**.

While the term Galvanic Enhanced Electrolyzer (G.E.E.) clarifies the nature of the technology as water electrolysis, it causes confusion when comparing it to conventional electrolyzers. The technology dissociates water into Hydrogen but not due to external energy. Since electrolysis of water requires 237KJ of External brute-force energy to dissociate a mole of water, it is not only difficult to comprehend but also impossible to explain how a small fraction of the 237KJ External energy can achieve such a high rate of dissociation. There is no technical similarity to clarify the H2IL technology as an electrolyzer.

In addition, when galvanic electrodes are used in a conventional alkaline electrolyzer, 237KJ per mole is a lot of energy for the metals to supply and would cause rapid electrode oxidation. The H2IL lab have confirmed, in many test applications and prototypes over the past 6 years, that rapid oxidation is not occurring. So even if the internal galvanic metals were providing the energy of 237KJ, minus the little input stimulus electricity, the metals would have to sacrifice a large amount of surface area.

Therefore, following 32 months of theory testing, analysis and consideration, H2IL confirms that the technology should be classed an Ion Accelerator, rather than an electrolyzer, for the following reasons.

1. Most the energy is harvest internally from galvanic metals while the atoms are in a charged state. The flow of ions is naturally caused by the voltage difference between bi-metals. The low energy input is simply a stimulus that accelerates the ions. To help understand this important aspect, consider energy consumption with conventional electrolysis. The 237KJ of electrical energy are forced atoms. Most of this energy is converted to heat energy from the process of converting an atom into an ion. Changing an atom to an ion is very energy intensive as can be understood by the process of changing an ion back to an atom within a fuel cell. In a fuel cell special metal catalysts are needed to do this intensive work.

The ions produced by the Galvanic metals are accelerated to induce a charge potential high enough to dissociate water without conversion to atoms. If they were first converted to stable atoms before splitting water, then it would still require 237KJ per mole or 60kWh of electricity to produce a kilogram of hydrogen.

2. Galvanic metals are metals that are more reactive than nodal metals. As stated in the galvanic series, there is a natural charge potential between metals that creates challenges for the construction and marine industry where salt water is present. For example, the potential difference between the metals Mg and Carbon is 1.9 volts DC. When the two metals make contact while exposed to sea water, oxidation occurs over several years and a small level of hydrogen is released. The level of hydrogen is usually too small to be noticed, so its not classified as a means of generating practical amounts.

The oxidation of the galvanic metal is an ionic redox reaction. In nature this reaction is very small as stated in the previous paragraph. But a technique that accelerates this ion reaction without brute-force energy would accelerate the natural oxidation effect without rapid oxidation of the metals. This is exactly what the H2IL technology does. The input electrical stimulus to accelerate the ion reaction only needs to be slight.

3. The physical structure and electrochemical process of the H2IL ion accelerator is very different to an electrolyzer. An electrolyzer is a device that converts Atoms (external electron flow) into Hydrogen and Heat. A bipolar tug of war rips the H2 atoms away from the O2 atom with brute-force current flow. The H2IL Ion Accelerator uses an additional electrochemical process to provide a condition where the atoms bonds are released with a small low current stimulus.

So to help understand how a large volume of hydrogen is produced for such a small energy It must be understood that the actual disassociation of water does not need brute-force energy. Rather, the converting an atom to an ion is what consumes most of the 237KJ of energy. Freeing hydrogen from water bonds does not need to be energy intensive but converting an atom to an ion is. The H2 atom has one electron so it can either gain or loose an electron while the O2 atom has six electrons in the outer shell. Therefore, in water bonds, the O2 atom is pulling two easily persuaded H2 atoms to bond. Simply present a condition where the O2 atom is more attracted to other atoms and the H2 atom can be released with little energy. While some aspects of this understanding may differ from conventional science on the subject of water dissociation, the electrochemistry theory is accurate and has proven to be true in practice within the H2IL technology. Conventional science on this subject is simply modeled by conventional knowledge of electrolysis.

In summery, most the energy is harvest internally from galvanic metals while the atoms are ions. The technology simply accelerates, or speeds up, the intensity of the ions. How it does this is all concealed in the 12 parts of the extensive hidden IP. The technology does not create energy, it simply releases a fuel from water bonds to be transformed into usable energy by fuel cells etc. The fact that hydrogen atoms are so abundant in water means that only a small portion of the fuel, released so easily, is being converted back into electricity to provide the input stimulus. The amount of hydrogen generated is only limited by scale and the volume of internal galvanic metal.