Outline of the New Chemical Species of Santilli MagneHydrogen (MH)

Definition of MagneHydrogen
Our Chief Scientist and Chairman of the Board, Dr. R. M. Santilli has conducted decades of preparatory mathematical, physical and chemical research at MIT (from 1974 to 1978), Harvard University (from 1978 to 1981) and at the Institute for Basic Research (from 1982 to present).

Following this extended research, Dr. Santilli published in 2003 at the International Journal of Hydrogen Energy in Oxford, England, the attached paper presenting for the first time the discovery of the new chemical species MagneHydrogen (US and international patents owned by MagneGas Corporation - additional patent applications are pending).

The new chemical species of Santilli MagneHydrogen (denoted with chemical symbol MH), consists of stable clusters comprising individual hydrogen atoms (H) and hydrogen molecules (H2 = H-H) (Where the symbol "-" denotes conventional valence bonds) which are kept together by a new attractive force, primarily magnetic, called MagneCular bonds, denoted with the symbol x. Consequently, MH is composed by a collection of clusters with increasing atomic weight of the type: MH2 = H2, MH3 = H-HxH, MH4 = H2xH2, MH5 = H2xH2xH, etc.

The new chemical species is contained in our combustible fuel Magnegas (MG). MagneHydrogen is obtained from MG via the use of conventional separation equipment (such as Vacuum Swing Absorption Stations). The industrial production of MH is currently under finalization.
Main advantages of MagneHydrogen over conventional Hydrogen
Chemical analyses, provided by attachment, establish that MH can be composed of hydrogen at desired purity (such as 99 percent), yet its specific weight is a multiple of conventional H2. This new chemical structure has major industrial implications, such as:

**Increased energy content**
By recalling that Natural Gas (NG) has an energy content of about 1000 BTU/scf and that conventional H2 has 300 BTU/scf, it is evident that a species of MH with a specific weight 3.5 times that of H2 has the same energy content of NG. This eliminates the need for MH to be stored via liquefaction for a number of uses (such as automotive), since MH can be conventionally compressed within the same range of NG.

**Increased liquefaction temperature**
It is known that only pure hydrogen liquefies at essentially the absolute zero degree temperature, 20 degrees Kelvin, while all other chemical species liquefy at higher temperatures. It is therefore evident that MH liquefies at a temperature higher than 20 degrees Kelvin in a way that is proportional to the increase of specific weight over that of H2. The advantages of the increased liquefaction temperature of MH over H2 are evident whenever liquefaction is needed, e.g., for our space or military programs.

**Lack of seepage**
Experimental evidence has established that the new MagneCular bonds occur between the Hydrogen atom and other atoms. This implies the creation of layers of Hydrogen atoms on the interior walls of a container at pressure to such an extent the seepage of conventional hydrogen through container walls is avoided. The H2 seepage causes a serious environmental problem for conventional hydrogen. In fact, once free in our atmosphere, hydrogen quickly rises to our ozone (O3) layer where we have one of the fastest known chemical reactions, H2 + O3 => H2O + O2. Hence, hydrogen seepage is one of the major sources of our current depletion of the ozone layer with serious health problems for mankind. In addition to resolving this environmental problem, MH also establishes for the first time the creation of long term storage of Hydrogen.

As a result of these features, MagneHydrogen has a distinct relevance for NASA, the DOE, and other governmental branches, e.g., because of the capability for the first time for long term storage of Hydrogen, increased energy output, and other
advantages. MH is also quite relevant for the petroleum, fertilizer, and other industries because of its faster reactivity as compared to that of conventional Hydrogen

**Experimental evidence on the existence of MagneHydrogen**

The original 2003 scientific paper included at its end two chemical analyses by two different laboratories, each analysis signed by its director, according to which the tested MH is 99.8 percent pure H, yet its specific weight is 15.06 atomic mass unit (*amu), namely, 7.47 times heavier than H2 (with 2.016 amu).

We also have a second independent certification from the Eprida Laboratories in Atlanta, Georgia, according to which the tested MH has 97.5 percent pure H while its specific weight is 3.8 times that of H2.

Finally, we provide confirmatory experimental evidence conducted at the analytic laboratory of MagneGas Corporation by the Canadian chemist Dr. Yun Yang confirming that the increased specific weight is essentially dependent on the process used for the separation of MH from MagneGas (MG). The description of the process is here avoided while it is under patent.

The analytical laboratory of MagneGas Corporation is available for independent measurements and verifications by qualified chemists at any mutually agreeable time.
Picture of a Mobile 150 kW MaGnegas Refinery producing about 1,500 cf of MG per hour with 60% Hydrogen content

Picture of a VSA (Vacuum Swing Adsorption) Station for the separation of MagneHydrogen (MH) from MagneGas (MG) for the production where and when desired of about 700 cf of MH per hour when attached to the above MG Refinery. MH production can be increased or decreased as desired.
A chemical analysis of MagneGas (MG) showing the presence of chemical species with atomic mass units 2, 3, 4, 5, 6, 7, 8, 9, etc. that confirm the presence of Dr. Santilli’s MagneCular Clusters $\text{MH}_2 = \text{H-H}$, $\text{MH}_3 = \text{H}_2\text{H}$, $\text{MH}_4 = \text{H}_2 \times \text{H}_2$, $\text{MH}_5 = \text{H}_2\text{H}_2\text{H}$, etc.
Chemical analyses establishing the anomalous adhesion of individual H-atoms to containers walls. The top picture shows the accretion of one H with amu 160, 161, 162, 163, 164, 167, 168, etc. remaining in the column of chromatographic equipment even after flushing, thus confirming the lack of seepage.

Another chemical analysis showing the anomalous adhesion of the individual H atoms contained in MH< such as the new species first detected by dr. Santilli of H3O = H2OxH at 19 amu, the new species of COH = COxH at 29 amu, the new species of CO2H = CO2xH at 45 amu, etc.
Artist's rendering of Dr. Santilli’s new chemical species of MagneCules. The top drawing shows the Elementary MagneCule, that composed by two atoms, such as HxH or CxH, etc., and the bottom drawing shows Dr. Santilli’s conception of H3 as HxHxH or as H2xH.
Example of measurements of specific weight of MH conducted at the Analytic Laboratory of MagneGas Corporation. The top view show a very sensitive scale used for measurements of weight, and the bottom view shows one of several calibrations of the instrument prior to testing MH to establish statistical errors.
Systematic measurements of the specific weight of MH (indicated by dots) with respect to the weight of conventional H2 (represented by the horizontal 0.0 base line) with statistical data below. The results of this particular test shows a species of MH which is at least 35% heavier than H2 when the statistical error is 2.9%. Since the result is more then ten times the error, the measurement is clear.

N2air
5 psi0.00440.599827
0.00460.627092
0.00320.436238
0.00410.55893
0 psi
0.00390.744331
0.00450.858844
0.00531.011527
0.00450.858844
Picture of the special GC-TCD gas analyzer used for detection of the H-percentage of MH via the column operated up to 400° C to destroy all Santilli MagneCules and reduce MH to H2.

Picture of the special GC-MS/IRD used to establish the lack of valence bond in Santilli’s MagneCular Clusters under the same injection.
A typical gas chromatographic analysis of MH. The top view is obtained via the GC-MS to identify the main clusters composing the species, while the bottom view identifies the existence of only one species with valence bond, since all other clusters have no IR signature.
Yet another chemical anomaly identified by Dr. Santilli. It is given by the certification by the Institute for UltraFast Spectroscopy of the City College of New York establishing that the flame temperature of MagneGas is of over 10,500° F, namely more than double the flame temperature of natural gas or Acetylene. This anomalous flame temperature establishes the high reactivity of the MH contained in MG.

To: Magneas
From: Robert R. Alfano
Subject: Magneas project “Temperature of MagneGas flames” results summary

The following is a summary of Magneas flame temperature measurements and its comparison to Blackbody Distribution.

Temperature was calculated using Wien’s law: $T = (2.89 \times 10^6) / \lambda_{\text{max}}$:

1. Temperature of Magneas Flame from crude oil + Oxygen: 3mm from base and fit with Blackbody. The peak wavelength of the flame is $\lambda_{\text{max}} = 473$nm. The corresponding temperature is: $T = 6,132$ Kelvins ($10,578$ Fahrenheit; $5,859$ Celsius).

2. Temperature of Magneas Flame from crude oil + Oxygen when cutting metal: at 3mm above the surface of metal while cutting it. (approximately 2mm from base of flame) And fit with Blackbody. The peak wavelength of the flame at $\lambda_{\text{max}} = 739$nm. The corresponding temperature is: $T = 3,920$ Kelvins ($6,997$ Fahrenheit; $3,697$ Celsius).

3. Temperature of Magneas Flame from antifreeze+ Oxygen: 3mm from base and fit with Blackbody. The peak wavelength of the flame at $\lambda_{\text{max}} = 763$nm. The corresponding temperature is: $T = 6,092$ Kelvins ($10,506$ Fahrenheit; $5,819$ Celsius).

4. Temperature of Magneas Flame from antifreeze+ Oxygen when cutting metal: at 3mm above the surface of metal while cutting it (approximately 2mm from base of flame), and fit with Blackbody. The peak wavelength of the flame at $\lambda_{\text{max}} = 735$nm. The corresponding temperature is: $T = 3,943$ Kelvins ($6,638$ Fahrenheit; $3,670$ Celsius).

The flame spectral intensity distribution has a non Blackbody Distribution form. Additional details are provided in a separate report. The measurements were performed by Hani Ahmar and Yuri Budiansky on February 15th-18th, 2012.

March 5, 2012