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REPORT ON GC-TCD ANALYSIS AND DENSITY MEASUREMENT OF MAGNEHYDROGEN

Magnegas Corporation requested that we analyze and measure the density of clusters of individual hydrogen atom and conventional molecules known as MagneHydrogen (with the chemical symbol MH), which has been separated from Magnegas.

GC Method

A new SRI Gas Chromatograph with a Thermal Conductivity Detector (model 8610C) was configured with a 3.18mm x 184cm packed silica gel stainless steel column followed by a 3.18mm x 368cm 5A Molecular Sieve stainless steel column. Ultra High Purity (UHP) Argon at 20psi was used as the carrier gas. A six port automated injector valve attached to a feed line from a 50ml plastic syringe pump, injected 1ml of gas into the GC. The valve body was heated to 60C and the initial starting temperature of the oven was 60C. After the automatic valve injected a sample, the oven temperature remained at 60C for 10 minutes and then ramped at 30C per minute for 8 minutes and held at 300C for one minute.

A plastic 50ml syringe was used to extract MagneHydrogen sample from a 250scf steel cylinder, which held the gas at approximately 2 psi. The same syringe setup was used to extract samples of UHP molecular hydrogen (H2) nitrogen (N2), oxygen (O2) and air used in calibrating the GC. Each gas was calibrated three times and at then at three different concentration levels. The plastic syringe was placed in Yale Apparatus YA-12 Programmable Syringe Pump. The syringe was attached to a 600cm x 1.59mm 316-stainless steel line with a Fischer Model 187 Electric Furnace with programmable temperature controls. Each end of the tube ran through 1/8" stainless steel needle valve to be able to isolate the gas trapped with the furnace when needed. The tube from the furnace was attached to a 182cm x 1.59mm 316-stainless steel line of which 170cm was immersed in an ice bath. The flow rate for the 25C test was set at 0.250ml/min and a minimum of 5ml was passed through the assembly before starting analysis. A set of consecutive scans (a minimum of 4) were conducted at each temperature set point until the hydrogen results varied by less than 1%. There was a minimum of seven minute holding period between scans.

Results

	Measured Constituents				
Temp	Hydrogen (H2)	Oxygen (02)	Nitrogen (N2)	Unknown 1	Unknown 2
25C	96.95%	0.46%	1.14%	0.83%	0.62%
400C	96.62%	0.00%	1.43%	0.85%	1.11%
500C	96.17%	0.00%	1.66%	0.90%	1.27%
800C	94.99%	0.00%	1.99%	0.83%	2.18%
900C	95.14%	0.00%	1.25%	0.83%	2.79%

Density Measurement

Density measurement different gases were used, including nitrogen 99.995%, helium 99.999%, molecular hydrogen 99.995%, and Magnehydrogen extracted from MagneGas. Each were placed individually in a 209.0 mL flask and weighed. Each measurement was repeated three times, with an average calculated. Atmospheric conditions were 769.6 Torr, 75.0 °F (23.9 °C), and 38% relative humidity.

The ideal gas law was used to determine the number of moles of gas in the flask, and then the formula weight of each gas was used to determine the mass of each gas in the flask. These calculations were done for high purity nitrogen, helium, and molecular hydrogen. Using these measurements, the vacuum mass of the flask alone was then calculated, as well as the density of each gas at the specific atmospheric conditions.

The mass and density of the Magnehydrogen in the flask was then determined. In direct comparison to high purity H2, the mass of Magnehydrogen is shown in Table 1.

Table 1

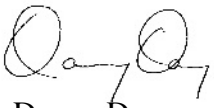
	Mass in Flask (grams)	**Density (grams/Liter)**
Hydrogen (99.995% H2)	0.0169	0.084
Magnehydrogen – (MH)	0.0658	0.315

Conclusions

The testing determined the density of the Magnehydrogen sample extracted from Magnegas to be 0.315 grams per liter at 741.7 Torr and 75.0 °F (23.9 °C).

The above analyses show that the specific weight of MH is 3.89 times the specific weight of H2, while the impurities in MH are only of about 3%. Consequently, the measurements herewith reported confirm the first achievement of MH by Dr. R. M. Santilli in Ref. [1] which is herewith appended, because only 3% impurities can not possibly account for the 3.89 fold increase of the specific weight. We should add that MH first presented in Ref. [1] was prepared by passing Magnegas through a Pressure Swing Adsorption Station, and the separated MH passed through the same station seven consecutive times, while the MH used in the measurements herewith report was obtained via one single passage through a Vacuum Swing Adsorption Station.

Best Regards



Danny Day
President
Eprida, Inc.

REFERENCE

[1] The novel magnecular species of hydrogen and oxygen with increased specific weight and energy content," R. M. Santilli, International Journal of Hydrogen Energy Vol. 28, page 177-196, 2003

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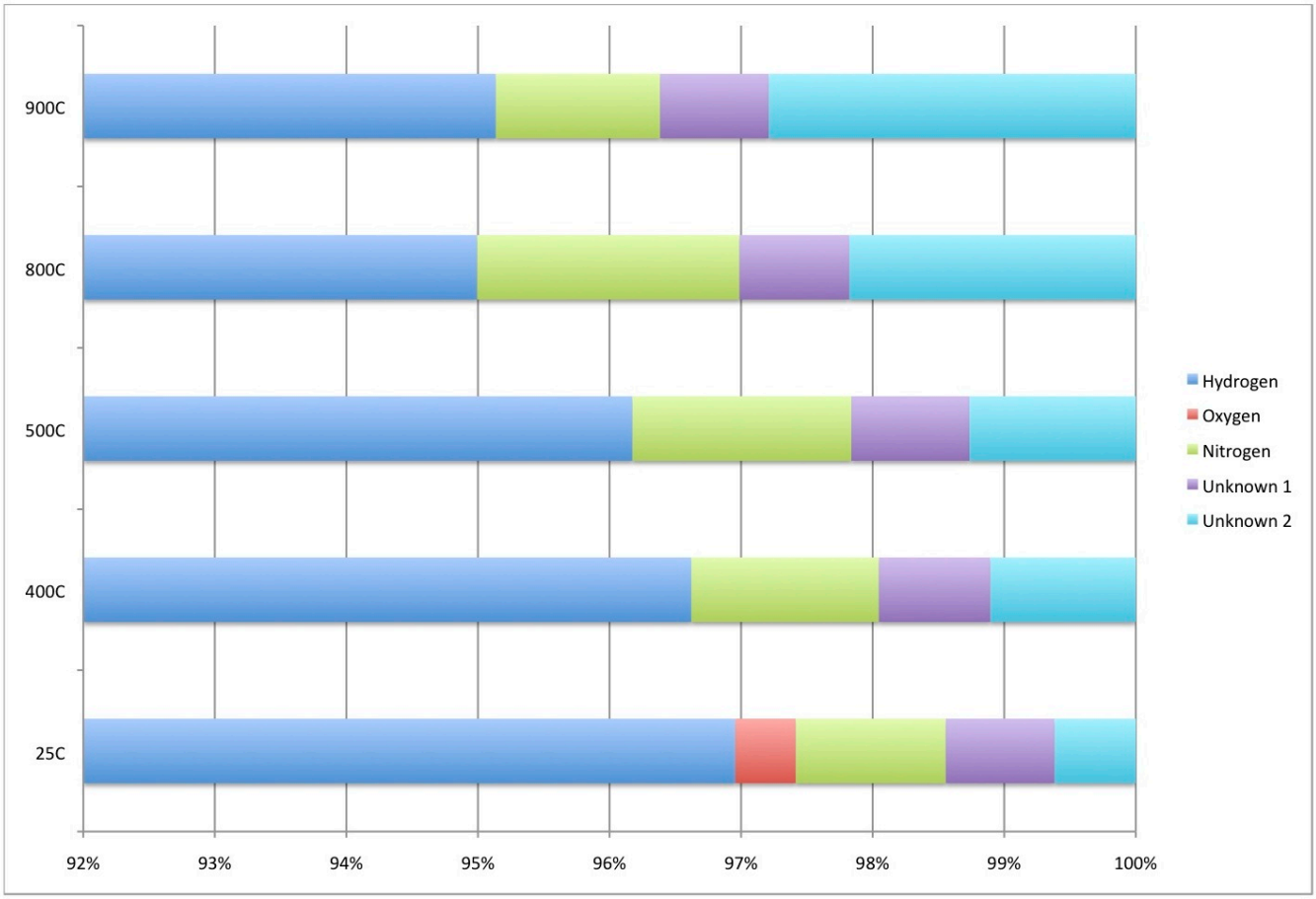
GC-TCD Analysis Graph Comparing Scans at Various Temperatures



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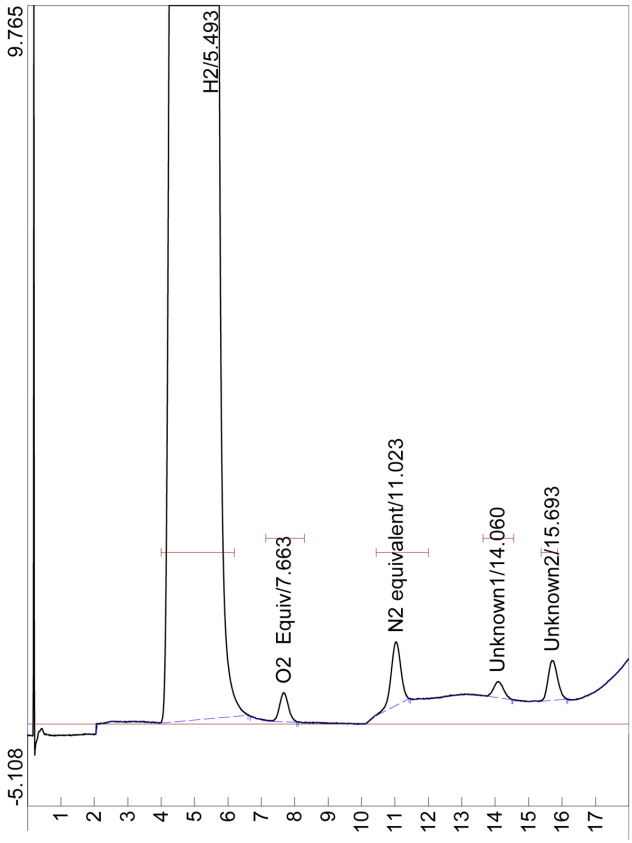
Lab name: Eprida
Client: Magnegas
Analysis date: 10/05/2011 13:00:57
Method: Automatic Injection
Description: TCD-CHANNEL 1
Carrier: Argon AT 20 PSI
Temp. prog: GP.TEM
Data file: MH GC -25C 60C-300C-04.chr ()
Sample: MH-extheated 25C- run04
Operator: DDay
Comments: MH heated through 304cm of 1/16"SS tube in external furnace at 25C (@0.250ml/min) then cooled through in place down to 60C then fed into GC operating at 60C for 10 mins then ramp 30C/min to 300Cthen hold for 1 min at -20psi- run04



Component	Retention	Area	Height	External	Units	Area %	Norm area %
H2	5.493	9718.1832	186.229	90.0369		99.4979	96.9520
O2 Equiv	7.663	7.1938	0.397	0.4286		0.0737	0.4615
N2 equivalent	11.023	17.7233	0.868	1.0604		0.1815	1.1418
Unknown1	14.060	4.5933	0.217	0.7680		0.0470	0.8270
Unknown2	15.693	10.6255	0.543	0.5736		0.1088	0.6176
		9758.3191		92.8675		100.0000	100.0000

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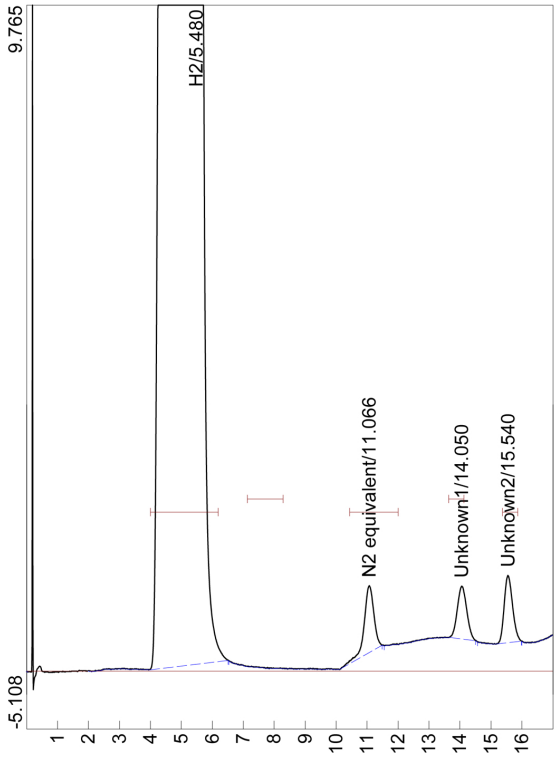
Lab name: Eprida
Client: Magnegas
Analysis date: 10/04/2011 20:52:15
Method: Automatic Injection
Description: TCD-CHANNEL 1
Carrier: Argon AT 20 PSI
Temp. prog: GP.TEM
Data file: MH GC -400C 60C-300C-24.CHR ()
Sample: MH-extheated 400C-24
Operator: DDay
Comments: MH heated through 304cm of 1/16"SS tube in external furnace at 400C then cooled through in place down to 60C then fed into GC operating at 60C for 10 mins then ramp 30C/min to 300Cthen hold for 1 min at -20psi- 24



Component	Retention	Area	Height	External	Units	Area %	Norm area %
H2	5.480	9469.7662	184.860	87.4215		99.4070	96.6198
O2 Equiv	0.000	0.0000	0.000	0.0000		0.0000	0.0000
N2 equivalent	11.066	21.5689	0.984	1.2904		0.2264	1.4262
Unknown1	14.050	16.3942	0.773	0.7680		0.1721	0.8488
Unknown2	15.540	18.5247	0.986	1.0000		0.1945	1.1052
		9526.2540		90.4799		100.0000	100.0000

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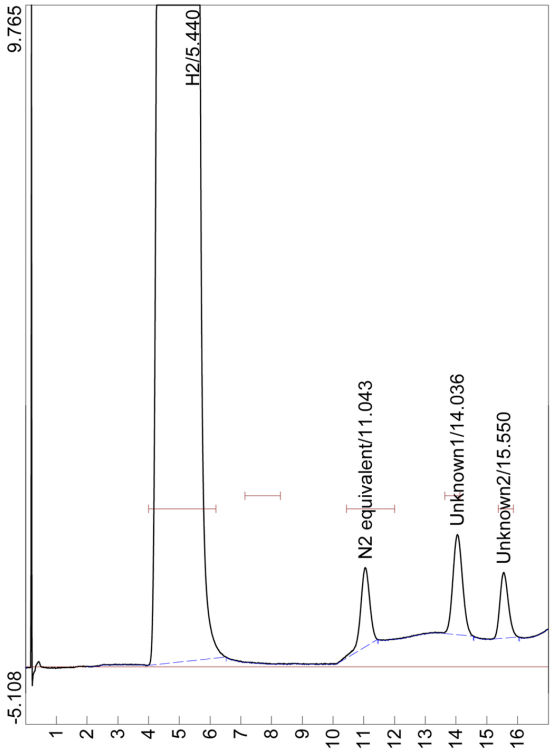
Lab name: Eprida
Client: Magnegas
Analysis date: 10/04/2011 21:41:52
Method: Automatic Injection
Description: TCD-CHANNEL 1
Carrier: Argon AT 20 PSI
Temp. prog: GP.TEM
Data file: MH GC -500C 60C-300C-26.CHR ()
Sample: MH-extheated 500C-26
Operator: DDay
Comments: MH heated through 304cm of 1/16"SS tube in external furnace at 500C (@0.150ml/min) then cooled through in place down to 60C then fed into GC operating at 60C for 10 mins then ramp 30C/min to 300Cthen hold for 1 min at -20psi- 26



Component	Retention	Area	Height	External	Units	Area %	Norm area %
H2	5.440	8817.4106	180.131	80.5533		99.1519	96.1243
O2 Equiv	0.000	0.0000	0.000	0.0000		0.0000	0.0000
N2 equivalent	11.043	24.6923	1.176	1.4773		0.2777	1.7629
Unknown1	14.036	32.1512	1.478	0.7680		0.3615	0.9165
Unknown2	15.550	18.5724	0.972	1.0026		0.2088	1.1964
		8892.8265		83.8012		100.0000	100.0000

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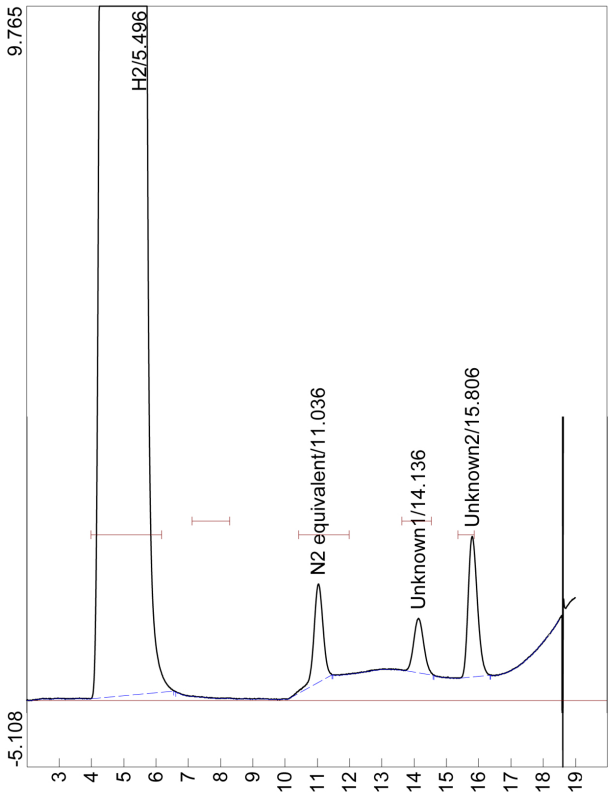
Lab name: Eprida
Client: Magnegas
Analysis date: 10/05/2011 19:01:33
Method: Automatic Injection
Description: TCD-CHANNEL 1
Carrier: Argon AT 20 PSI
Temp. prog: GP.TEM
Data file: MH GC -800C 60C-300C-sy2-02.chr ()
Sample: MH-extheated 800C- run16
Operator: DDay
Comments: MH heated through 304cm of 1/16"SS tube in external furnace at 800C (@2.50ml/min) then cooled through in place down to 60C then fed into GC operating at 60C for 10 mins then ramp 30C/min to 300Cthen hold for 1 min at -20psi- run16



Component	Retention	Area	Height	External	Units	Area %	Norm area %
H2	5.496	9524.3176	184.638	87.9958		99.1296	95.0711
O2 Equiv	0.000	0.0000	0.000	0.0000		0.0000	0.0000
N2 equivalent	11.036	27.9932	1.390	1.6748		0.2914	1.8094
Unknown1	14.136	16.3762	0.767	0.7680		0.1704	0.8298
Unknown2	15.806	39.2599	1.982	2.1193		0.4086	2.2897
		9607.9469		92.5579		100.0000	100.0000

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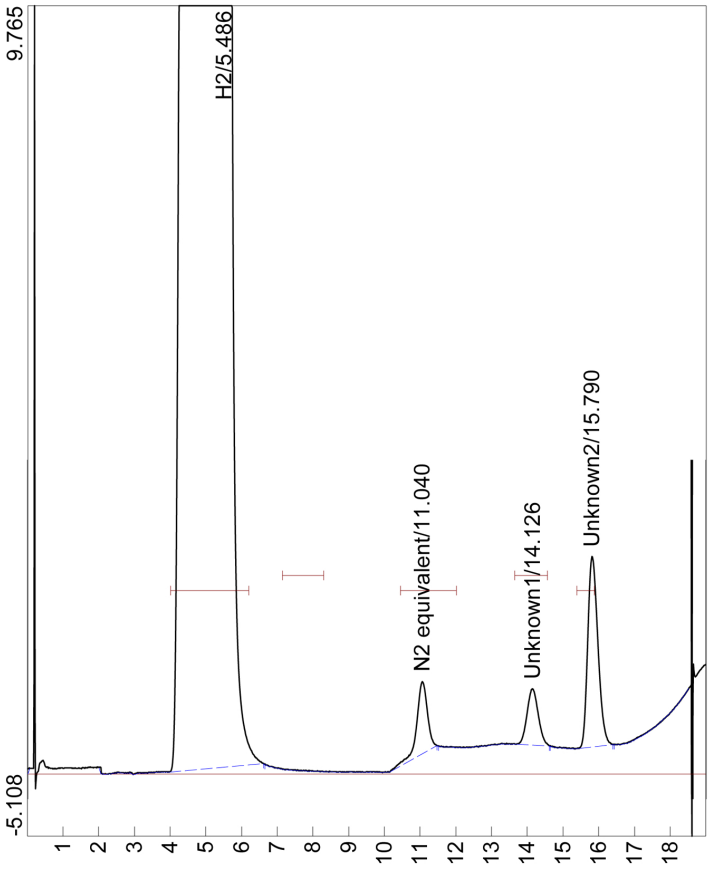
Lab name: Eprida
Client: Magnegas
Analysis date: 10/05/2011 21:17:54
Method: Automatic Injection
Description: TCD-CHANNEL 1
Carrier: Argon AT 20 PSI
Temp. prog: GP.TEM
Data file: MH GC -900C 60C-300C-sy2-00.chr ()
Sample: MH-extheated 900C- run20
Operator: DDay
Comments: MH heated through 304cm of 1/16"SS tube in external furnace at 900C (@2.50ml/min) then cooled through in place down to 60C then fed into GC operating at 60C for 10 mins then ramp 30C/min to 300Cthen hold for 1 min at -20psi- run20



Component	Retention	Area	Height	External	Units	Area %	Norm area %
H2	5.486	9557.3530	184.697	88.3436		99.1387	95.1303
O2 Equiv	0.000	0.0000	0.000	0.0000		0.0000	0.0000
N2 equivalent	11.040	19.4977	0.926	1.1665		0.2023	1.2561
Unknown1	14.126	15.5940	0.718	0.7680		0.1618	0.8270
Unknown2	15.790	47.9367	2.420	2.5877		0.4972	2.7865
		9640.3814		92.8659		100.0000	100.0000

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