ANOMALOUS HEAT IN CARBON/LEAD/HYDROGEN SYSTEMS.

Simple And Accessible – But Is It LENR?

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ABSTRACT.

While investigating the electrolytic activation of granular carbon for use as a catalyst for generating pure hydrogen from water and a metallic hydroxyl ion acceptor, members of a research group here and in the USA witnessed sudden and unexpected evolution of considerable amounts of thermal energy, and the release of what is probably Beta radiation. In all cases this resulted in (at least) the breaching of the electrolysis cell. We present a full account of the test methodology, a hypothesis for the origin of the heat element of this event, and offer assistance to researchers who would like to investigate this further.

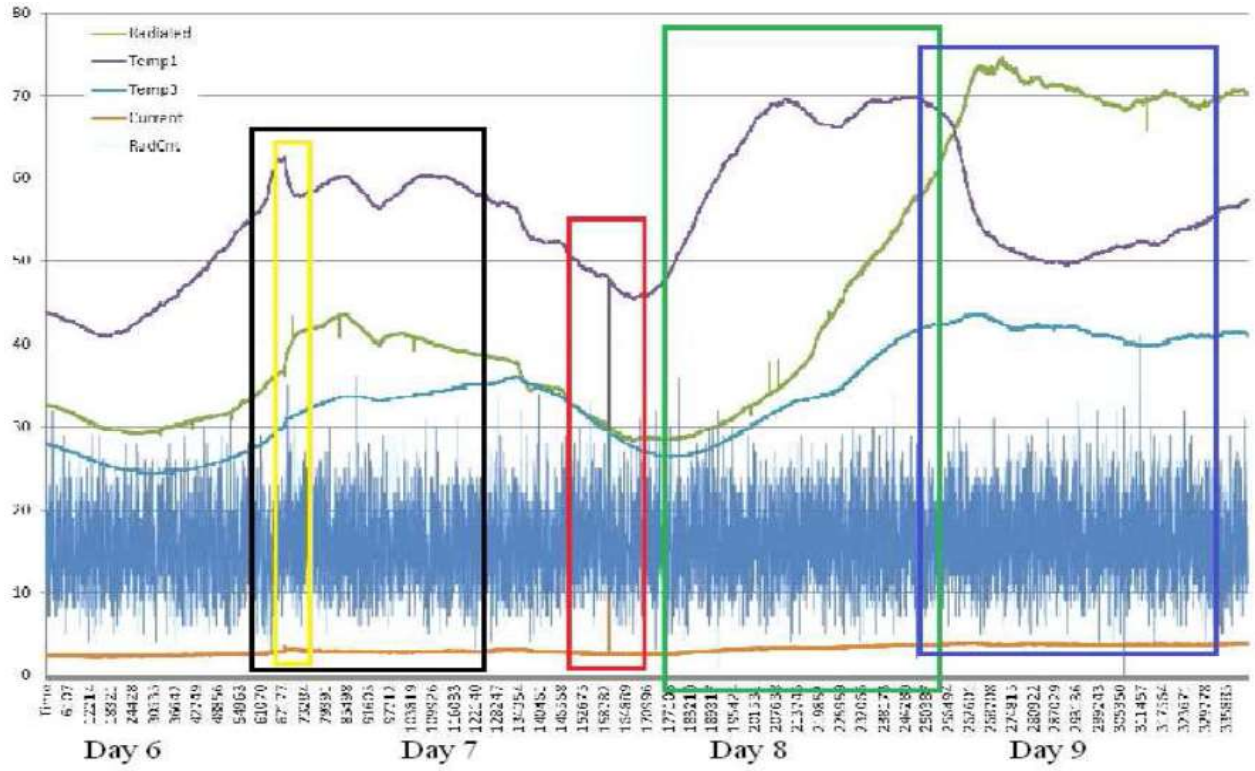

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Figure 1. SYSTEM HEAT, RADIATION AND CURRENT PROFILES.

BACKGROUND

Since early 2015 we have been investigating technology surrounding the patent application briefly summarised below. The Inventor, a US citizen Dr. Howard Phillips is the owner of the application, itself an update on earlier granted patents describing the same basic process. LFH has been granted a license to further investigate and develop the phenomenon, and to provide information and raw materials to other potential developers. The product of interest, a high rate constant water-splitting catalyst is called 'Catalytic Carbon' (CC) and Dr. Phllips refers to the whole system as 'Hydrogen on Demand' (HOD)

While manufacturing batches of Catalytic Carbon – using the electrolytic method described here, one of LFH's team left it cooking for too long (he went fishing) and as a result discovered something very unexpected – anomalous heat and a burst of radiation. Figure 1 above shows the radiation spike - in the red box. The sudden and dramatic burst of heat (in a 5 litre plastic tank) with negligible additional electrolysis current was enough to rupture the tank and dump the whole mess out onto his workbench. This happened 6 times to members of a small group in the UK and USA during the course of many experiments – but we found the effect capricious and difficult to repeat at will. Now we suspect we know why.

DR. PHILLIPS CATALYTIC CARBON

Howard Phillips is owner of the Phillips Company in Georgia USA, an FDA-registered pharmaceutical manufacturing company and the world's only not-for-profit in the field. The company has licensed 21 new pharmaceutical products to other companies since 2009. Dr. Phillips says of this particular discovery, 'we are not an energy company, we are not a hardware-products company. We plan to encourage other companies to take our hydrogen fuel technology to the world'. As Dr. Phillips has granted Lookingforheat.com a license, we actually sell all the equipment required to produce Catalytic Carbon (CC). See more at:- http://www.lookingforheat.com/a-source-of-hydrogen/

THE PHILLIPS PATENT APPLICATION.

METHODS AND SYSTEMS FOR PRODUCING HYDROGEN : WO 2013016367 A1

ABSTRACT

Carbon can be electro-activated and used to catalyse a chemical reaction with water and a fuel, such as aluminium, to generate hydrogen, where the by-products are unchanged carbon catalyst, and aluminium oxide or aluminium hydroxide. Controlling the temperature of the reaction, and the amounts of aluminium and electro-activated carbon can provide hydrogen on demand at any desired rate of hydrogen generation.

SUMMARY OF CLAIMS

The carbon material may be pure carbon, solid carbon, crushed carbon, sintered carbon, carbon composites, charcoal, pressed carbon, carbon blocks, graphite, carbon granules, granulated activated carbon or coal.

The electro-activated carbon and liquid composition (essentially a slurry in water) is mixed with a fuel; and at the right temperature generates a rapid chemical reaction between the combination of the electro-activated carbon, liquid composition and fuel to produce hydrogen. The fuel may be pure aluminium, aluminium powder, aluminium granules or aluminum shavings. (Similar group metals, such as magnesium, work equally well).

NOTE. Scrap aluminium in the form of recycled packaging etc is entirely suitable for producing hydrogen by this process. Initially concerned about the very high energy inputs required to produce virgin aluminium in arc-furnaces, the authors discovered that in much of the UK aluminum fragments are land-filled. The official reason for this is that because the UK's last remaining smelter is in the far north of Scotland, separating and transporting the scrap so far is not economic.

The rate of the chemical reaction that produces hydrogen is controlled by heating the carbon/water/fuel combination to increase production or by cooling the combination to decrease production of hydrogen. An optimal temperature range for vigorous hydrogen production is 150F to 190 Fahrenheit. The water

used may be tap water, dirty water, high-calcium water, salt water, alkaline or acidic.

NOTE : As with any catalytic/chemical process surface area of the reactants is important, so the authors of this paper generally use aluminium shavings from industry or recycled foil as fuel. Powders are as might be expected faster-acting.

MAKING CATALYTIC CARBON

The Phillips method for producing a catalyst for hydrogen production is electrolytic, fast, and very simple. It requires an electrolysis tank containing carbon material packed closely and topped up with water containing an electrolyte. Our usual electrolyte is a saturated solution of sodium carbonate. The carbon material can be any single type, or a mixture of carbon black, crushed carbon, sintered carbon, carbon composites, charcoal, graphite, carbon granules, granulated activated carbon or coal. The source and purity of the carbonaceous material does not seem to be a limiting factor, but for reasons of convenience and cost research group members have mainly used crushed anthracite or coconut-shell derived carbon granules. Results in terms of catalysing hydrogen production have also been obtained using carbon black pigment powder (very messy!) and graphite. The tank uses lead sheet electrodes, which we suspect were vital in creating the 'LENR effect'. The basic catalysing process requires an electrical input of at least 6 ampere-hours. Normally we aim for around 12VDC at 2A for 3+ hours, to avoid excessive joule

4 Here you can see a set-up typical of those used to grab data while electrolysing catalytic carbon. There are six thermos-sensor pairs which are submerged close to the anode and cathode (not seen here) with the third pair central in the tank. The infra-red sensor sits above the liquid surface. In the RHS can be seen the Geiger counter tube which (not shown here) was submerged in the tank for some runs.

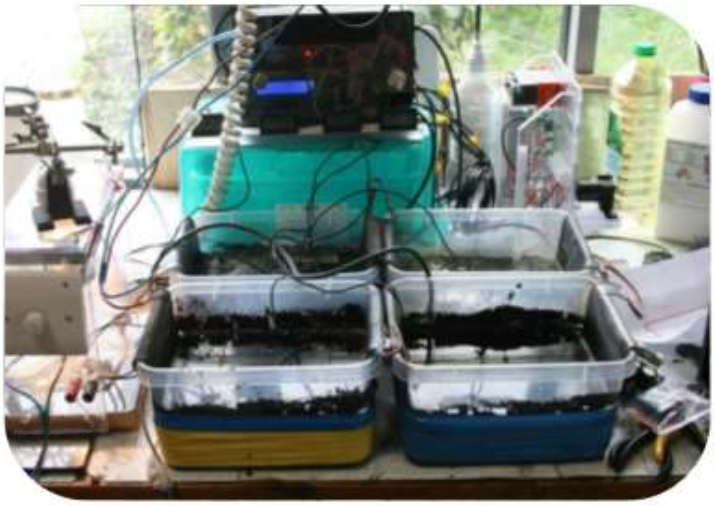
RUNNING THE EXPERIMENTS.

Following reports of several vigorous exothermic events during routine preparation of CC, coming in from HOD research group members in both the UK and USA, for most of which there was only anecdotal evidence LFH set up a couple of test systems. The four-tank system shown here is one of these.

Group members had been using different carbon particle sources, different electrolytes in various concentrations and so on. Also we only had anecdotal evidence for the phenomenon. To simplify things as much was possible we settled on what seemed to be a 'minimal variables' system – with data-logging -for test purposes. This consisted of 4 four-litre polypropylene tanks, filled with a saturated (at room temp.) solution of sodium carbonate in de-ionised water. Each tank held 800gr of carbon granules derived from coconut shell, This is the type commonly used for filtration in aquariums.

The set-up shown below is typical of those used when hunting for XSH. 4 tanks, all connected in series with less data collection points per tank. The lead sheet electrodes can be clearly seen. Notice that the tank on the LHS has field coils wrapped around it, fed with 50Hz AC from the Triac on the left. A single SBM-20 geiger tube was located where the 4 tanks meet. Applying magnetic fields was just one of many variables we tried out during the course of over 20 tests. But in none of these tests using the system shown did we see any anomalous heat or unexpected radiation. The most interesting radiation finding was that using a sensitive mobile probe we could locate small transient 'hot-spots' of short lived but intense Beta radiation * in the mass of carbon under the surface of the electrolyte.

* We assume Betas are being produced since the radiation is too penetrating to be Alphas, yet too weak to be Gammas. But as yet we have no further prrof or evidence that this is the case.



THE TESTING PROGRAMME.

Using the 4-tank set-up we ran two 8-day tests without additives, or deviating from the power-temperature regime. Nothing unusual was observed.

The next step was to try to recreate some of the conditions we thought might trigger a heat event, in particular adding back in the typical impurities present in the crushed Anthracite – or things we surmised might be 'promoters' . We ran 2 more 8 day tests with the 4 tank system. Additives were iron, bismuth, sulphur, heavy water (o.1%), potassium, lithium. 1 tank was retained as a control in both runs.

There were no unusual events observed. We were 'whistling in the dark'.

Finally we ran a 2-tank eight-day test using crushed Anthracite and town water. Nothing seen.

THE NEW HYPOTHESIS.

The puzzle remained for a long time, until reading – and 'unravelling' this patent:- **US 20130276771 A1 - Abstract.**

This invention relates to a method of generating thermal energy, by contacting the surface of a metal with hydrogen gas, forming a surface having hydrogen absorbed thereon. The hydrogenated surface is then exposed to an oxygen atmosphere, when the oxygen component reacts with the absorbed hydrogen to produce thermal energy. In between these two steps, the metal surface is activated with an atmosphere comprising water. Thermal energy given off during this process is reported to be considerably higher than can be accounted for by chemistry alone.

Then the puzzle became clearer. In all other experiments carried out by the group, they were using previously used lead sheet electrodes. The tendency was to set up an electrolysis system, run it, strip it down and put the electrodes back into stock. Anodes became Cathodes- and vice versa. There was no control. But in all the experiments run to isolate and replicate the effect this did not happen. So could it be that lead, being closely related to Palladium, was being loaded with Hydrogen in one experiment and then bombarded with Oxygen in another?

More experiments are required to determine if this hypothesis is the possible answer - meanwhile the puzzle remains – and is this LENR or is it 'super-catalysis' or 'pico chemistry'?