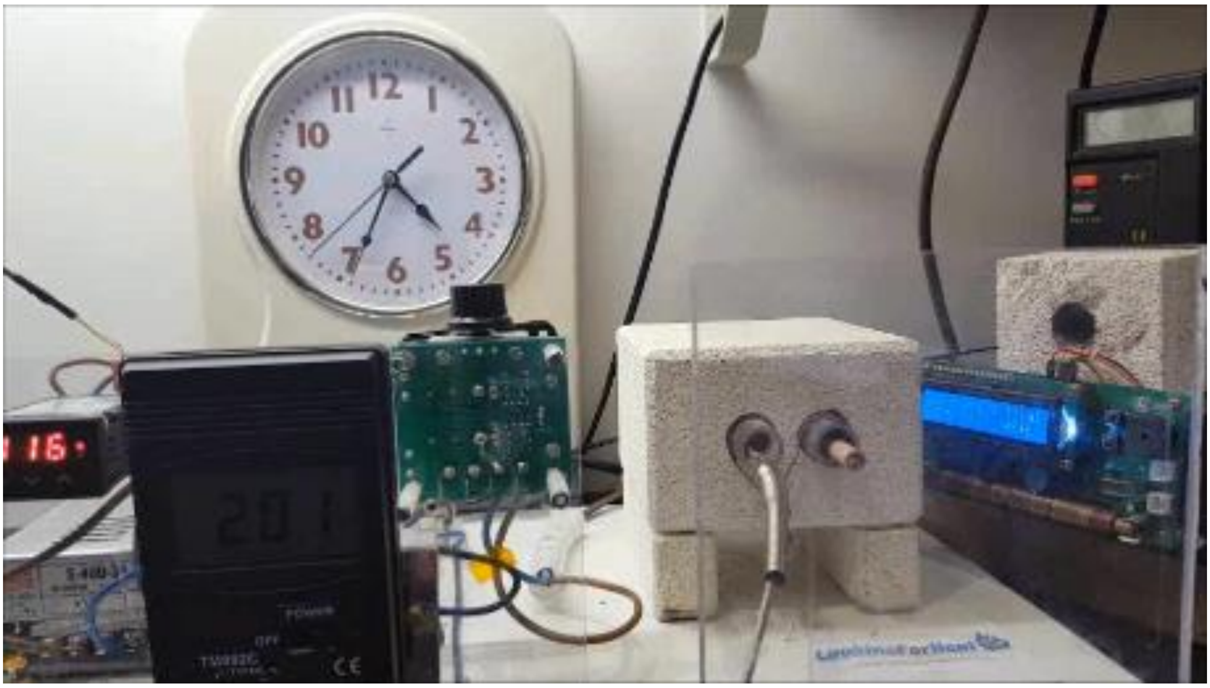
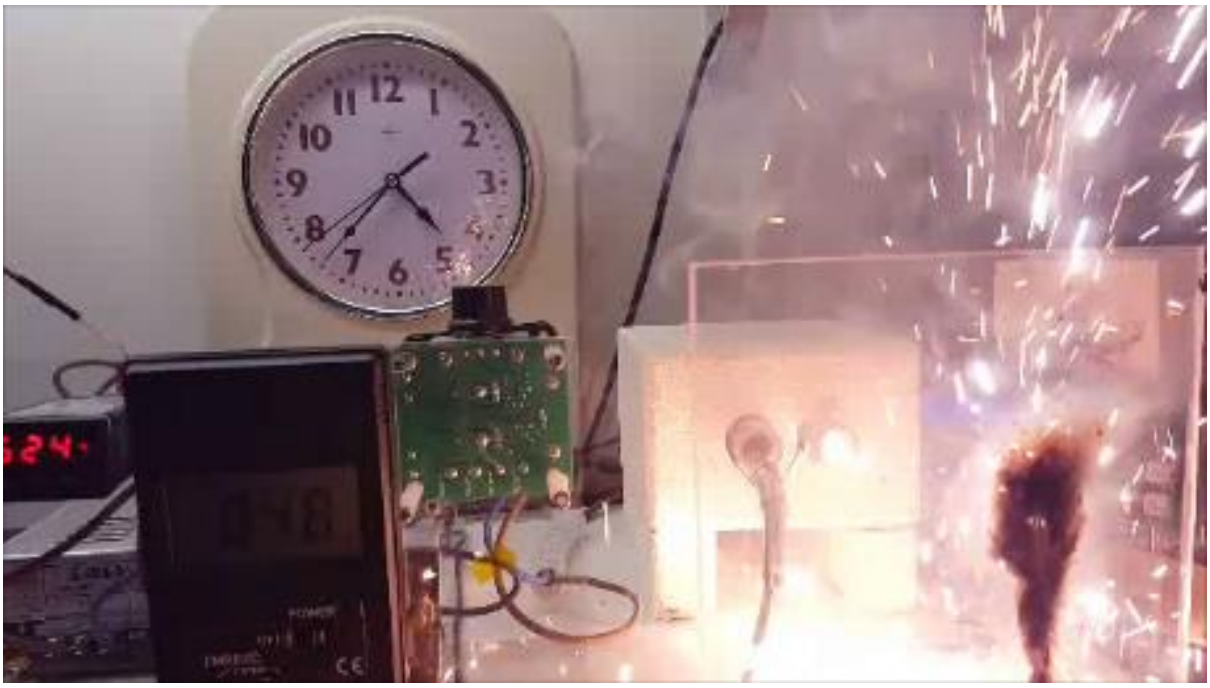
THE THERMITE EXPERIMENTS PART1 – MELT-DOWNS, A GUIDE FOR LENR FAKING

Alan Smith - www.lookingforheat.com. August 2016.



FROM HERE………..TO HERE IN 3 MINUTES



PURPOSE OF THE EXPERIMENTS.

One of the criticisms regularly heard from LENR skeptics is that observed phenomena, such as melt-downs and anomalous heat, are probably the result of chemical effects - and can be 'easily' reproduced using chemistry alone. This assertion is often challenged by LENR experimenters and their supporters, but insofar as the 'Looking For Heat' lab-rats know, nobody has ever tried using simple chemistry to make a convincing facsimile of a successful LENR experiment. So we have investigated and experimented to see just how easy (or hard) it would be. **We suspect faking it will be hard.**

FAKE FUEL CANDIDATES.

The prolonged bursts of heat typically demonstrated in successful LENR experiments require the output of a considerable amount of chemical energy. Of course, due to the relatively small volume available inside most experimental reactors (you soon realise that they look much bigger on the outside than they are on the inside) the chemical payload is limited, so a very energetic reaction is required. This means, for reasons given below, solid non-hydrocarbons

LIQUID, VAPOUR, OR GAS FUELS.

We need rocket-fuel, not the stuff you run a race-car on, for while the energy content of a gram of Gasoline is high (40-50kJ/gram depending on grade) each gram also requires over 3 grams of pure oxygen to release that energy. The combustion products of Gasoline vapour (at the required temperatures it would be vapour) inside a reactor also create a large volume of superheated steam and carbon dioxide, as shown in the formula here, which is for the closely related hydrocarbon Ethane.

BURNING ETHANE.

$2\ C_2H_6 + 7\ O_2$ ---------> $4\ CO_2 + 6\ H_2O$ - in our case (reactor temperature 200C+) here the energy released is in the form of hot gas and superheated steam. It would end badly!
The numerous technical problems and extra equipment involved in organising the slow release of this energy are too complex to be concealed easily, the result would be a pretty big explosion with little build-up in the form of visible 'anomalous heat' as a fore-runner. For this, and lots of other reasons, we decided that gas or vapour phase chemistry was not practical for a demonstration which requires the slow release of large amounts of heat energy with little extraneous equipment (pumps, gas-bottles) on show.

SOLID FUELS.

The first candidates for our investigation were what might be described as 'popular explosives'. One of the most energetic explosive compounds is TNT (trinitrotoluene). The energy released by the explosion of 1 gram of this material is approximately 4000 Joules (4kJ). This kind of energy release is big enough to be interesting for our experimental purposes. The first obstacle to experimenting with TNT and similar materials is availability. Since they are potentially useful tools for bad men, explosives are not easy to obtain, though their careful synthesis in small quantities is (if illegal) not too difficult. The real problem is their energy release characteristics, which are extremely rapid and not easy to moderate. In a few milliseconds everything turns to hot gas. Also, there is nothing left behind that might be described as 'ash'. What would be ideal is a highly energetic fuel which could be engineered to release heat slowly, not emit large volumes of gaseous by-products of combustion, and leave behind a residue that might be mistaken for the kind of fuels used in LENR experiments.

OUR CHOSEN MIX

We did not have to look too far to find a chemical candidate. Indeed, it has been suggested from time to time that 'fakers must have used it.' Our best choice is Thermite, which in its standard form is a simple mix of Iron Oxide and Aluminium powders. Thermite is one of the most energetic chemical mixes known, capable of releasing up to 4kJ/gram of thermal energy, and burning at well over 3000C. It also contains it's own oxygen supply and has the advantage of not releasing any gaseous reaction products. An excellent website containing a lot of information on the main types of Thermite can be found at:- http://www.ilpi.com/genchem/demo/thermite/

The most common type of Thermite consists of Iron Oxide and Aluminium powders. Exact stoichiometry, which is the term used to describe a mix with chemically correct ratio of Iron Oxide to Aluminium powder by weight is 2.96 :1.

The reaction is written:-

$$Fe_2O_3 + 2Al > 2Fe + Al_2O_3 + \Delta H \quad \text{(H = energy released)}$$

The total enthalpy change (enthalpy = total energy content) of this reaction is calculated to be, $\Delta H = 3.985$ kJ/g. Most of the energy is released quickly, but the metallic Iron and the Aluminum Oxide seen at the end of the reaction are molten liquids and as they cool and solidify they give up additional thermal energy included in this figure. For the purpose of the experiment let us assume we get 4kJ/gm.

1 Joule = 1 watt/second, so a gram of Thermite gives us heat output equivalent to 4kW for 1 second. Since the molten reaction products take time to cool, we could assume that we see this heat over a longer time period of perhaps 100 seconds, giving a thermal yield equivalent to 40 watts fed into a perfect resistor over that period of time – enough to show a substantial 'bump' in the data.

THE FAKER'S CHOICE.

A less well-known version of Thermite can be made which might fi the bill very well. In this version Iron Oxide is replaced by Nickel Oxide. The chemical reaction is as follows:-

$$3NiO + 2Al > 3Ni + Al_2O_3 + \Delta H$$

The correct stoichiometric ratio of NiO to Aluminum powder by weight is 4.15:1. The change in enthalpy of this reaction is calculated to be, ΔH = -The total change in enthalpy (energy release) is equivalent to 3.44 kJ/g.

As can be seen, Nickel Thermite produces a slightly less energetic reaction than the version based on Iron. However, it does have advantages in that it produces Nickel/Aluminium ash, the 'post LENR' look of which could be enhanced by adding traces of Lithium and Copper to the mix before ignition.

THE FIRST RUN, AND THE NEXT STEPS.

For a first system test we prepared what might be called 'Fast Thermite', in which 10% of the Al powder was replaced by Magnesium powder. This makes ignition easier but the downside is that it increases the reaction rate. The end result can be seen in our videos (full speed and slow motion).

The explosive nature of the reaction using this faster Iron-based Thermite means that it is unsuitable for reproducing any of the interesting LENR data that has been accepted as 'good' so far, for example Parkhomov.

We plan to undertake further experiments using Ni-based Thermites probably blended with inert moderator compounds like Aluminium Oxide powder- to slow down the energy release. By upping the amount of material in the reactor to 5Gr. (the maximum amount that space in the fuel tubes permits) and slowing down the reaction with moderators we might see a bump of around 10kJ in total, which should show in the data-logger graphs nicely. Enough to look like LENR? Doubtful, but the experiments to come will reveal all.