Please read the following document with the help of Dr Alexander Parkhomov's published paper here

21st August 2015

Parkhomov adds detail on the material preparation process

"The mixing and grinding of the fuel mixture I make in a porcelain mortar porcelain pestle with a duration of several minutes. You should check whether suitable LiAlH4 (whether is violent reactionwith water). Preferably the Nickel before applying to dry, warming it at a temperature of 200 ° C for several hours."

It would appear that there is little oxidation of the nickel below 250ºC (maybe reduction) see chart page 174

http://goo.gl/Zclfx8

http://www.unconv-science.org/pdf/7/parkhomov-en.pdf

14th May 2015

Alexander answers question on materials used in 3 day run.

"The analysis of composition of reactor tube and container wasn't made. I assume that the tube constits 50% of Al203 and 50% of SiO2. The container - usual stainless steel (chrome (about 18%), nickel (10 - 11%), manganese (about 2%), silicon and titan (0,8%), other iron)."

16th April 2015

Parkhomov speaks about pressure profile.
https://youtu.be/8WgZ0MWTYW4

And more about his experiments
https://youtu.be/XWtxnkaDSU0

26th March 2015

Video of days presentation

Screen grabs of slides

Translations here and of whole presentation here

Key innovations were

- a crimped steel sleeve holding the fuel (perforated with 3 small holes for gas exchange), this acts as a heat spreader, but more importantly, allows for easy installation of the fuel load, it can be cleanly pushed into place with the filler rods. It also indicates that the reaction DOES NOT require Al2O3 as the reaction surface and that it is indeed taking place between the solid Nickel mesh and the molten Li-Al-H wetted to its surface. (Note: there is a small contact at the ends)

- by using a long tube, standard epoxy sealant could be used greatly simplifying construction and lowering barrier to entry.

- Positioning of the thermocouple on the outside of the reaction chamber, but on the inside of the heater allows for a second TC on the outside. This then can reveal heat flux and so help determine if heat is derived from the core or the heater.

- Evolved H2 could have fixed O2 into water and it condensed in the areas under 100ºC thus lowering pressure.

22nd March 2015

Dr. Parkhomov reports that the target temperature of 1200ºC in the fuelled reactor was achieved by the time the electric power had reached around 600 W (in contrast to 1070 W needed to reach 1200ºC in the dummy). Then within an hour, the regulator had decreased the input power to just 330 W to maintain the same 1200ºC. Approximately, this has been the power required to during the whole operation of the reactor.

The thermocouple is fixed on surface of tube with fuel in the middle of the tube.

Operation of the reactor was interrupted due to a heater burn-out at 10:50 on March 20 (Moscow time). Fortunately though, the tube with fuel wasn't damaged.

When a replacement heater was used, the reactor RESTARTED!! at 11:10 on March 21 and works still.

This is the first independent report of high power LENR being able to be cooled down and re-started.

Dr. Parkhomov, Thankyou.

We need to replicate this with extreme urgency, if verified, we might be at the dawn of the New Fire era.

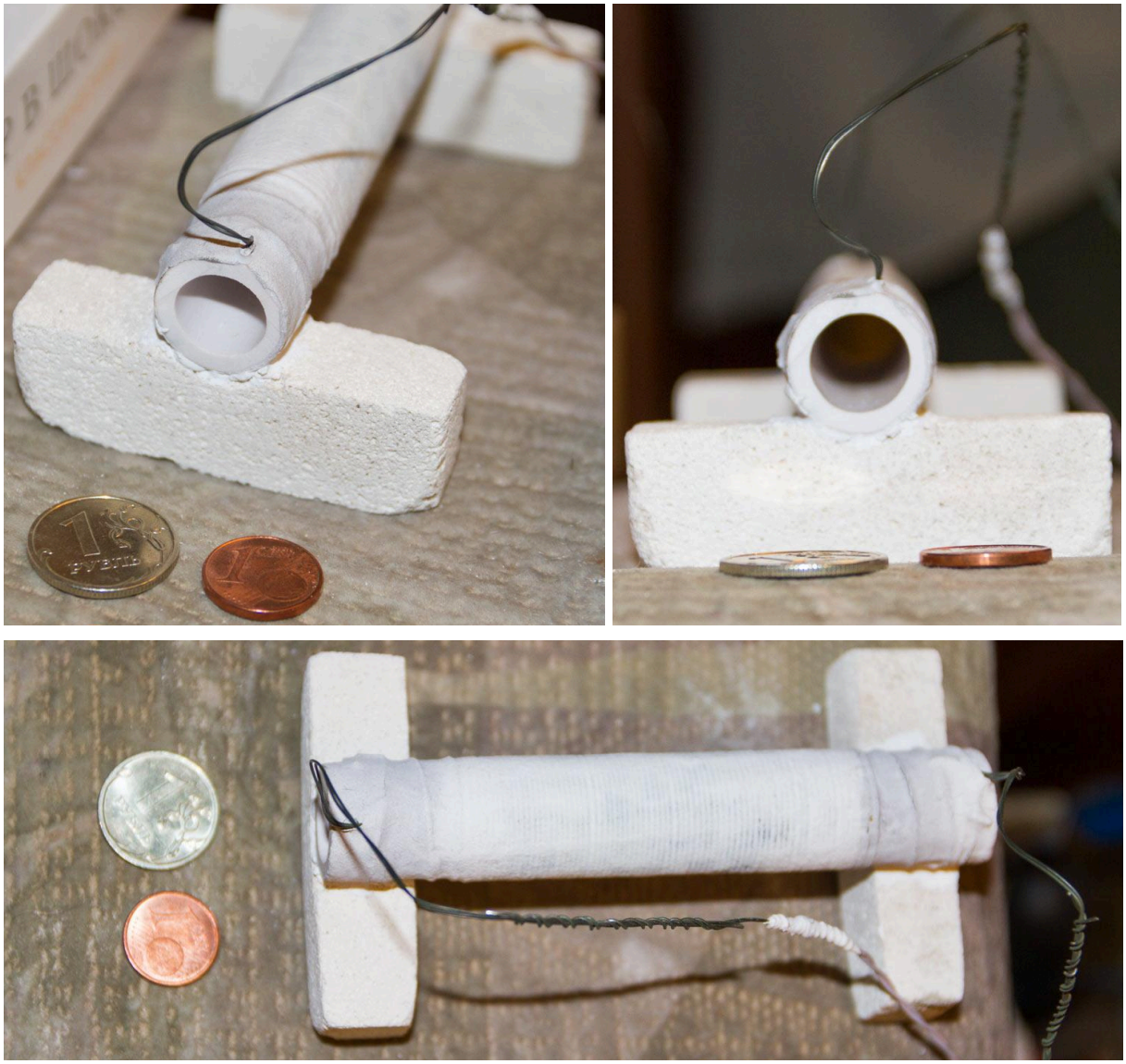
Re-heat and settling time to 1200ºC, after the cool down and heater replacement, took just 3 hours which compares favourably to the first heat up time of 12 hours.

18 March 2015

Dr. Parkhomov has managed to get a reactor running for the first time long term (more than 90 minutes of excess heat) and has attached a manometer. As of 09:53 CET 18 March 2015, it was still running. He reports similar pressure profile to the first MFMP fuelled []=Project Dog Bone=[] test (although lower peak) where we saw a rise and then the pressure going below atmospheric. Instantaneous COP is **very** encouraging, but need to account for 12 hour heat up time etc. It needs proper analysis when the experiment has ended before any firm statements can be made and Dr. Parkhomov will share these findings on March 26, 1015

27th February 2015 experiment design

Heater design
The key advancement in design for the 27th/28th test was a tube furnace using high temperature 0.5mm FeCrAl heater wire (similar to the Kanthal A1 wire the MFMP has been using for its Lugano thermal verification tests), with separate fuelled core. The Russian resistance wire manufacturer quoted that the wire is capable of operating at 1400ºC - though, as MFMP investigations found, this is only likely to be the case for short periods of time in air, and probably no more than 10 hours when embedded in Alumina as is the case here.



New heater design detail

ALL reactors he has tested have failed eventually, assuming they have been Hydrogen tight to start with, they have failed in one of two ways.

1. The heater coil burned out/shorted/melted.

2. The ceramic tube was breached.

The failure potential of the heater coil in previous experiments was made worse by direct coupling to the core meaning localised heat events could raise local temperatures and that he was using NiChrome wire which when embedded in alumina cement could not withstand temperatures in excess of 1290. In the new design, not only is a more thermally capable heater

wire used, it is in a separate element meaning that any localised heat events express themselves over a wider area on the heater coil.

The new design allowed for expansion and the consistent inclusion of a thermocouple.

Ceramic extrusions used in new reactor

Here is a video showing the tubes used to make the reactor http://youtu.be/eDJHg-p_TN4

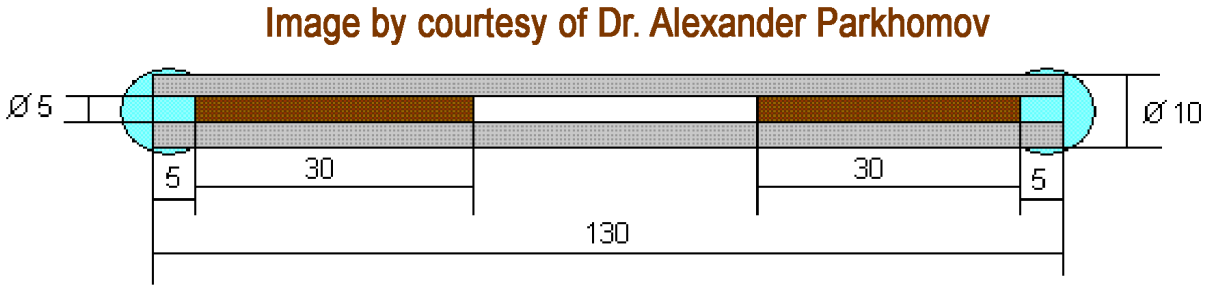
Heater tube approximate thickness 2mm , OD 18mm, ID 14mm, Length 135mm

Reactor tube OD 10mm, ID 5mm, Length 135mm

Source of similar tubes
http://www.earthwaterfire.com/pdf_library/sizes.pdf

The filler rod was made from cheap 2 bore thermocouple extrusion, Dr. Parkhomov filled it by sucking alumina cement into it like a straw. Alumina rods of this size are very expensive.

Reactor schematic



Safety

Powders

Ready to mix

Dr. Parkhomov, like many a struggling scientist in Russia, cannot afford the luxury of the usual array of safety equipment that the MFMP would recommend to anyone exploring this kind of research.

When asked “how do you prepare your powders, do you have some kind of glove bag and breathing apparatus?” He answered, “I take them out of the cupboard here” (goes to a cupboard and pulls out some containers) and continues “and I mix them in this pestle and mortar.”

When asked why he is not worried about nickel particles in the air and on his skin, he gestures that he is not flicking it up into the air, and also points out that he has an ionizer (of course, home built) and a circulating air filter, each device at opposite ends of the lounge.

When asked about the very real danger of moisture decomposition of LiAlH4, he said that “LiAlH4 just needs to be dry and in a dark place”, and he noted that the thing about his flat in Moscow is that the humidity is normally between 15 and 20%, and it was a really dark room, just one small window at one end, so he does not worry.

The new Nickel powder, purchased from the internet from a Russian supplier

The dark,dry cupboard opened, showing LiAlH4 in two airtight containers

So, no gloves, overcoat, mask, glove bag, desiccant or cover gas etc. This is not recommended, but it does mean he can mix and load in air.

Dr. Parkhomov also confirmed that does not treat the nickel or LiAlH4 powder in any way other than mixing it in the proportions 1g / 0.1g respectively. He has not tried any other powder ratios as of 27/02/15 - but he intends to. He does not see the point in increasing the proportion of LiAlH4, perhaps it may be worthwhile decreasing it though.

Peter Gluck “I have searched for the new sort of nickel he is using- it is Ni-carbonyl powder according to GOST 9722-97 (Like ASTM, DIN) type PNK-O2See please here- with Google Translate http://meganorm.ru/Data2/1/4294820/4294820717.pdf”

Supplier of material as per the label - http://rushim.ru/product_info.php?products_id=4929

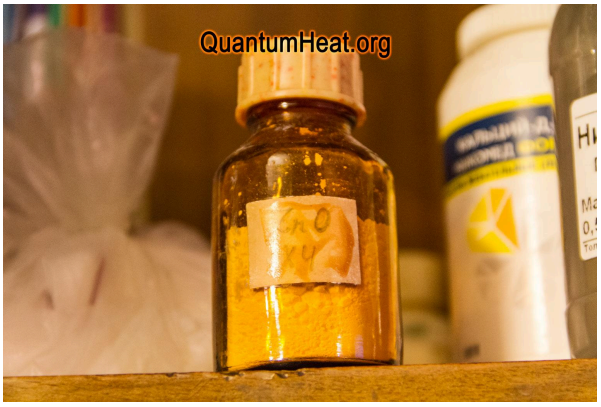
MSDS safety sheets

LiAlH4 - http://bit.ly/1KFYrRH
Vale 255 nickel powder (as used in MFMP ‘Bang!’ experiment) - http://bit.ly/1EELxOK
Sodium metasilicate (Na2SiO3) - http://bit.ly/1BZIHEZ
Al2O3 - http://bit.ly/18srmqm
ZrO - http://bit.ly/1DYiOAD

Sealing

Dr. Parkhomov used the following ingredients and proportions to seal his reactors

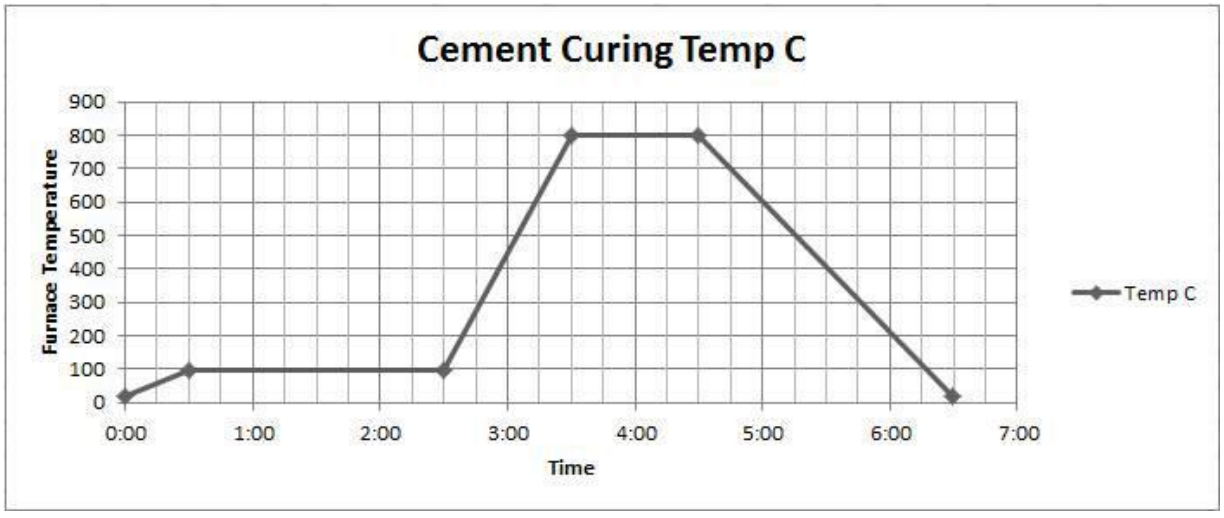
Al2O3 powder ~2 µm particle size	1.5 g
ZnO powder particle size unknown	0.5 g
Na2SiO3 solution 37.5%	2.9 ml



In the foreground is a bottle of ZnO, in the background is a bag of Al2O3 and also a white container on the right with a pop-off lid Dr. Parkhomov also stores AL2O3 in this for convenience.

Just of to the right is the new Nickel powder.

In the above photo, you can see Al2O3 in the top container and a mixture of Al2O3 and ZnO in the bottom container. The two are mixed in the pestle and mortar. When needed they are mixed with the Na2SiO3 in the plastic mixing tray to the right, which looks like a blister from a PP3 battery.



Temperature profile for curing cement prior to the 5 hours during the experiment

The MFMP tried in January to seal Alumina tubes (from McMaster Carr) with the Parkhomov sealing approach, without success (see http://bit.ly/1LHrHmb and http://bit.ly/1BflFHd). Dr. Parkhomov responded to our study by saying that we needed to wet the inside of the tube first with sodium metasilicate first to allow wetting of the filler and to do several layers of filler, to overcome pores that we saw that had resulted in leaks in our sealing tests. Effectively we needed to have off-set pores to make it hydrogen tight.

The reactor building process is done over 2 days.

Our Na2SiO3 solution

But that might not be the most important factor. It turns out that the 'Alumina' tubes that Alexander is using are not 95% - 99.5% pure like the ones we had used from the likes of Coorstek, they are in fact only 50% pure - with the rest being made of silicates and he mentioned Mg also.

Using 50% pure alumina tubes might allow the silicate based plug to adhere to the wall of the reactor more easily for one thing, and with Mg present, there could also be some other chemistry going on that might result in the anomalous heat. One other thing to note is that the tubes themselves may be far less robust and might result in easier structural failure. In addition, with other elements present, it could be easier for Lithium and temperature to eat away at the tube resulting in pores that would leak H2.

The plug is made first with a cylinder of alumina (thermocouple with cement sucked in like a straw) which keeps the bulk of the moisture away from the LiAlH4. then three separate applications of cement to ensure no direct-through pores that may form leaks, each time waiting for it to dry. After that, additional brushed on layers of the cement are applied.

Power and control

The first Lugano analogue experiment that Parkhomov ran used a number of thyristors in phase angle switching mode, however, he found that it was too difficult with the equipment he had to accurately measure the power input.

Here is a 3D scan of the setup https://skfb.ly/DpMv

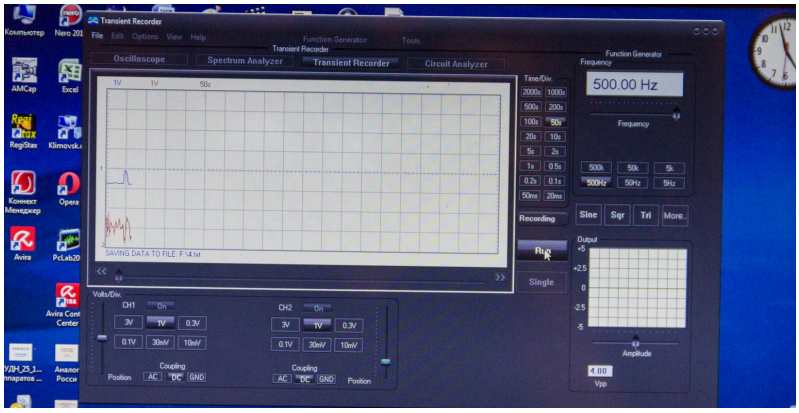
He then went on to use a Variac (variable transformer) with a load matching transformer and a target temperature cut off circuit.

He has ALWAYS used AC, the fact that it was 50hz and full sine wave was independently confirmed during the test by way of a DMM in frequency and duty cycle modes.
Reactor temperature monitoring

A battery powered analog thermocouple amplifier and display with switchable ranges is used to provide temperature monitoring and a signal to the power regulator.

Thermocouple amplifier and display set to 100ºC full range

Thermocouple amplifier and display set to 1000ºC full range



A laptop running PCLAB-2000 was displaying and recording the reactors temperature derived from a K-type thermocouple attached to the outside of the reactor and held in place with cement and a signal proportional to the counter rate from the SI-8B Geiger-Muller tube.

Input power monitoring

Current is monitored by a 5A/10A range switchable ammeter

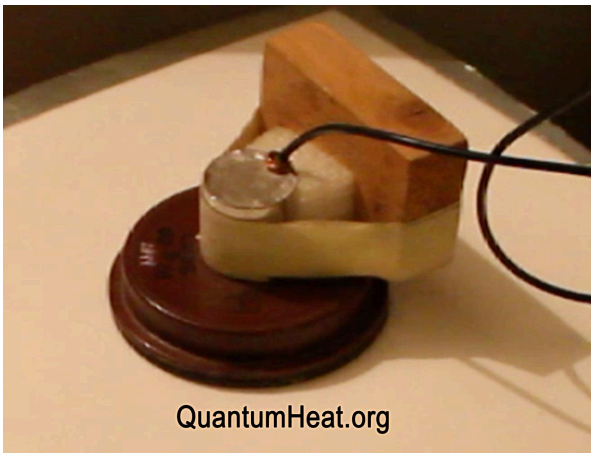
Volts were measured by a digital multi meter

Instantaneous power over 100W was monitored by a domestic power meter that produced a pulse every 1125 joules. It also captures total power used over 100W.

You can see the second computer that logs the power pulses here

http://youtu.be/dnUQVQHC1t8

Radiation monitoring



SI-8B ‘pancake’ Geiger counter that has a thin mica window. It can detect beta, gamma, alpha and soft x-rays.
The output from this is acquired on the same laptop running PCLAB-2000 as the reactor temperature.

A standard Russian army issue personal dosimeter DK-02 pen is used also adjacent to the reactor.
Here are two for less than $20 on Ebay http://ebay.to/1wXu9hC with some nice close up images.

For neutron detection, a pre-calibrated Indium foil was suspended in the calorimeter water. Nearing the end of the experiment, this was removed and placed between two Geiger counters, one set to read minimum counts, the other maximum counts per second. In the calibration, these to count rates were equivalent. If during the experiment, Neutrons had activated the Indium, the count rates would change. They did not.

Here is a video of the placement at the beginning of the experiment http://youtu.be/qJN20uKFPPg and retrieval http://youtu.be/GB0jCBymbGY

Water measurement and addition

Water was measured carefully in approx 1-200g amounts on a scale accurate to 1g

Dr. Parkhomov used a waterproof eyeliner pencil to mark the start water level in the reactor by drawing a horizontal line on the light coloured enamel on the inside of the outer pan.

Water is added regularly and recorded in the experiment notes which you can see later in this document as circled entries. Dr. Parkhomov has a feel for when is the right time to do this, as temperature goes up, more regular / larger amounts are required. This should be automated as per suggestions later in the doc.

The calorimeter

The calorimeter consists of two old enamel pans, one with a lid into which the reactor is placed. this is then set on some spacers into the other larger pan. Outside of that is a foiled card with reflective surface facing inwards. A piece of carpet is strapped on the outside for insulation and the whole outside is strapped into place with string.

The difference in diameter of the pans is where the water is placed. Additionally, water is placed on the in the depression in the lid, helping to keep the lid cool and capture some of the heat exposure here that would be lost to convection.

A 1” rigid plastic foam board, also foil backed, is placed on the top to provide insulation and allow the water vapour to be released

Here is a 3D scan of the calorimeter https://skfb.ly/Dp9I

Where wires will get really hot (like the heater wires and thermocouple leads), they were protected by painting on them, some of the same cement as used to seal the reactors and coat their bodies.

In cooler areas, to avoid shorting to each other and to the pan body, especially as passed under the pan lid, they they were covered in silicone tubing.

Verifications and observations

http://youtu.be/3g118Jj_GzA
Checked power calculation method, volts, temperature of water, observed vapour

Vapour quality video http://youtu.be/SDtMd9-1w1s

Observed spillage due to bubbling of water over the reservoir lip, amounting to a few drops, this is also likely to occur during calibration runs and might account for part of the up to 10% error.

Observed a radiator that was on around 70 cm from one side of the insulation

Observed convective and radiative losses, the top of the pan lid was free to lose an amount of energy via convection and radiation.

Since the heater is less likely to fail, it less likely he will NOT be able to observe HAD unless he deliberately kills the power.

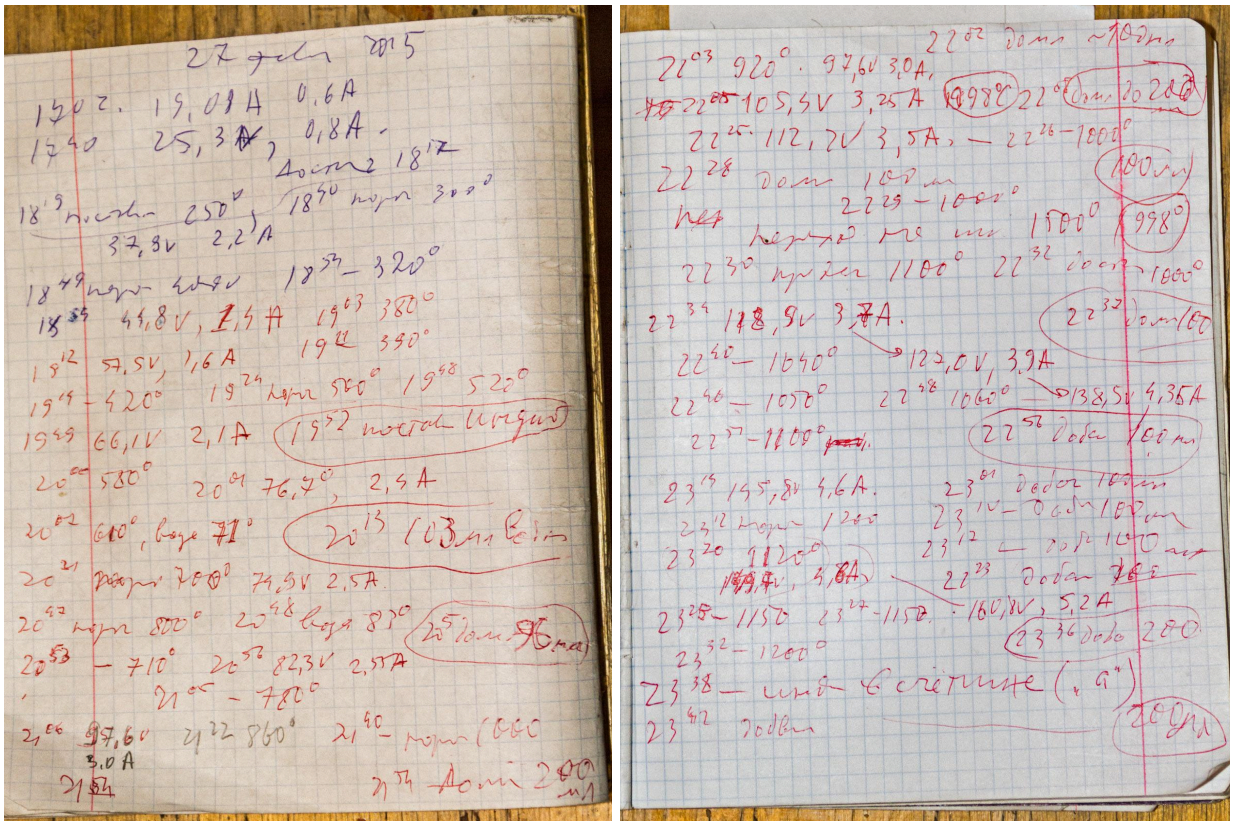
Results

How many runs with excess heat has Dr. Parkhomov seen?

This question was asked many times in different ways and the answer was always the same.

With the original powder (that he is reserving his last gram of for analysis) where the reactor remained intact long enough, he saw excess heat in each of the four runs that met these conditions. Most of his runs to date have been to verify the set-up.

In the case of of the 27th/28th Feb 2015 experiment, where a new type of powder was used the experiment was shut down after a spot check determined a COP of 1, post cool down it was seen that the reactor had been breached. Further analysis of the data is needed before it is known if the new experiment showed an anomalous heat event.



Backup data as recorded up to midnight 27th February 2015, the ringed entries are the times for and amount of water added.

Dr. Parkhomov has shared the raw data and his calculations here http://bit.ly/1DGvufm

He notes:

"I send Excel file with the data obtained in our experiment. Air temperature near the installation was about 25°C. We, unfortunately, took water temperature incidentally. At a temperature of reactor more than 1000°C water temperature is about 95°C, decreased on 10-15°C at the moment of water refilling."

Dr. Parkhomov's data analysis

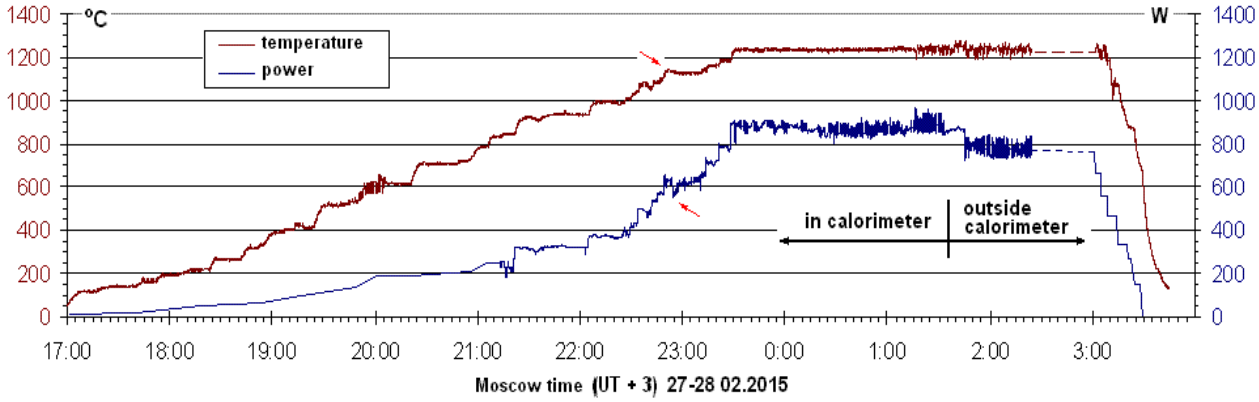
Dr. Parkhomov said that a control run with no fuel using the same new set up before the fuelled run produced a 1.05 COP.

Below you can see the generalised results of Dr Parkhomov's processing of the data acquired during the experiment on February 27 - 28, 2015.

Temperature	°C	800-1000	1000-1100	1100-1200	1200-1240
Duration of Regime	Minutes	62	48	36	110
Electrical Input Power	W	250-400	400-600	600-850	850-900
Electrical Input Energy	kJ	1057	1294	1496	5636
Mass of Evaporated Water	kg	0,35	0,45	0,60	2,00
Energy to Heat Water to Boiling	kJ	110	141	189	628
Energy Spent on Evaporation	kJ	791	1017	1356	4520
Heat Leakage Through Insulation	W	40	50	60	70
Heat Leakage Through Insulation	kJ	149	72	130	462
Total Emitted Heat Energy	kJ	1049	1230	1674	5610
Ratio of Emitted Heat Energy to Input Energy		**0,99**	**0,95**	**1,12**	**1,00**

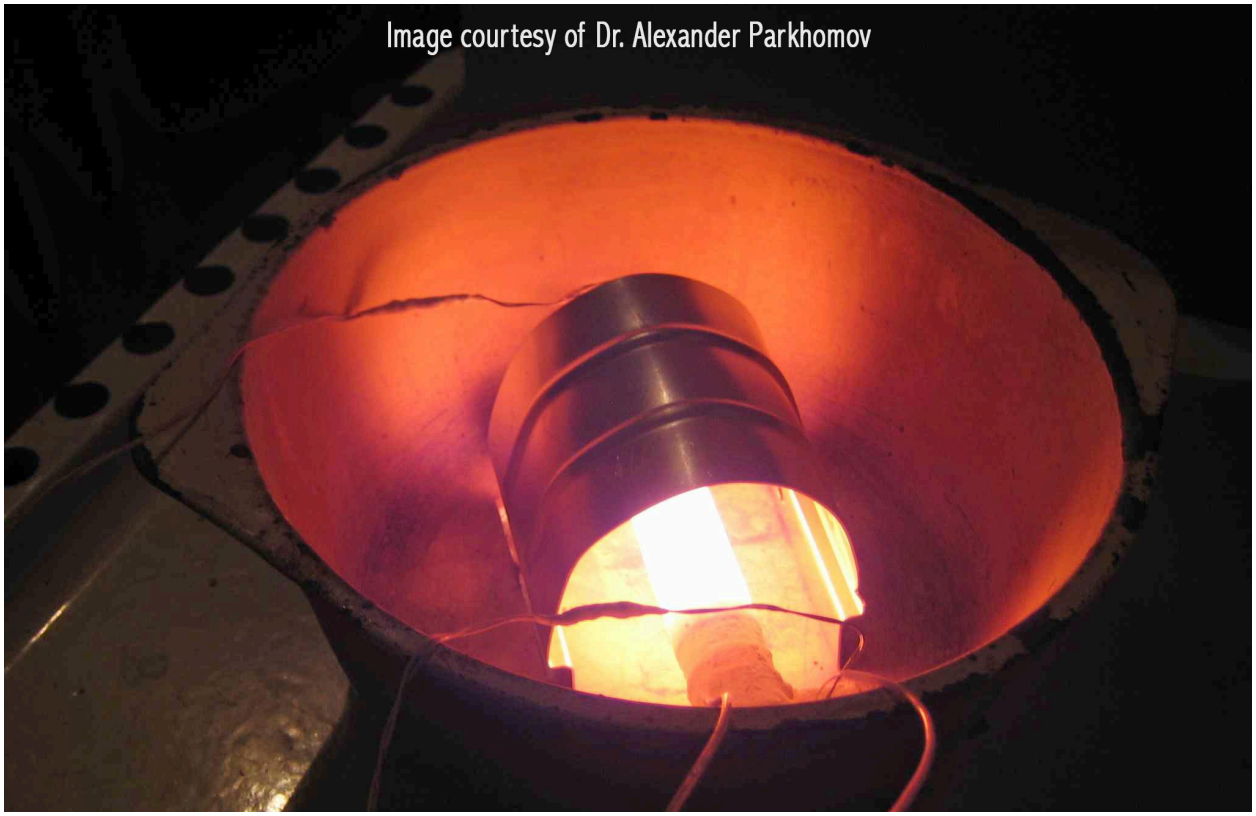
Dr. Parkhomov's summary of the reactor at various stages in the experiment

The chart below shows the power consumed by the electric heater vs temperature on the reactor surface in the middle of the tube furnace. Power was gradually increased to a temperature of about 1200 ^{o}C over a period of about 6.5 hours.



Dr. Parkhomov's chart showing power and temperature over time

After that from 11:35 to 03:08 this temperature was maintained by means of the automatic regulator.



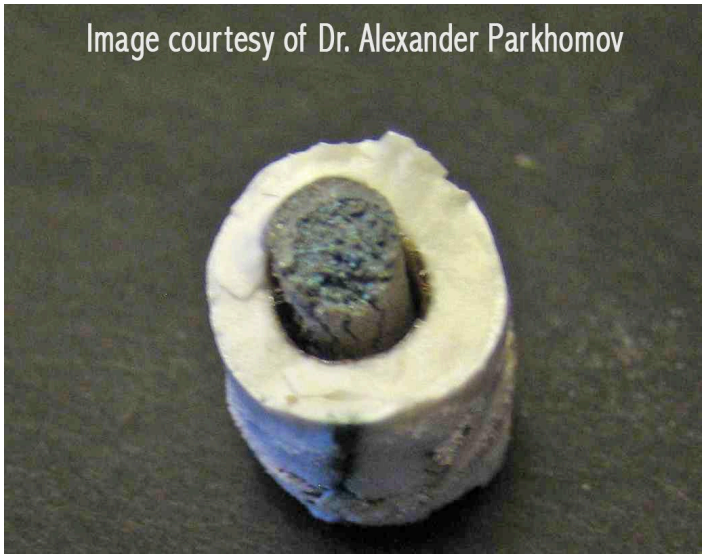
At 1:35, the reactor, together with the heater was taken from the calorimeter.

Temperature of 1200 ^{o}C was maintained in this mode too. Further heater power gradually decreased and at 3:28 the heater was switched off.

The data necessary for calculation of the relation of the emitted energy to consumed (COP) are provided in the table. Calculation is made for 4 operating modes (800-1000^{o}C, 1000-1100^{o}C, 1100-1200^{o}C and near 1200^{o}C). The size COP slightly exceed 1 only for the mode 1100-1200^{o}C.

After cooling the reactor, it was observed that it had split into three parts where the fuel had been inside.

The reactor breached in two places
You can see sintering of the fuel and metallisation of the inside of the Alumina tube similar to that seen in the MFMP's "Bang!" experiment.



Detailed look at fuel in centre part of breached reactor

Dr. Parkhomov says -

“It is possible that there was localised warming of the tube leading to its destruction before reaching 1200^{o}C. It is clear that further work took place without excess energy.

The probable moment when there was a warming up which caused destruction is shown on the chart by a red arrow. There was a rapid growth of temperature between 1110 to 1130 ^{o}C which was automatically compensated by deceleration of power of the electro heater.”

This may be very important data if verified by further tests for three reasons:

1. May mean that no Nickel is needed in heater, leaving the way open for SiC heaters that can reliably operate at high temperatures
2. May mean that the specific nickel powder Dr Parkhomov first used is not so important
3. Based on the calibration of our Silicon Carbide element, by taking the external temperature in our "Bang!" experiment of 1052ºC, the internal temperature should have been around 1125ºC. See this data: http://bit.ly/1wKNYZF

So could we be looking at a critical temperature? There is the possibility that this could be a momentary chemical based energy release, but we are reminded that Rossi said in late 2012 that his reactors EXTERNAL temperature when running in self sustain mode was between 1030ºC and 1070ºC.

http://bit.ly/1wKYkbP

It must also be noted that a COP of 1.12 for the 1100-1200 temperature range is just a little outside error as calculated by his other dummy runs. Having said that, Dr. Parkhomov’s calculation period does include the time after failure if his assumption about failure time is correct. This would have the effect of depressing COP figures.

How Dr. Parkhomov calculates the leakage rate

Heat loss through thermal insulation is calculated in this way:

"I measure the rate of cooling of the reactor after electric heating switching off. It is defined as a result of measurements of the water temperature protected from evaporation by an oil film. Typical value 0,007 °C/c at water temperature of 90-95 °C. On the known mass of iron vessels (3,5 kg), water (1 kg), ceramic tubes of the reactor and heater (0,13 kg), it is possible to find installation thermal capacity (about 5800 J / °C). Multiplying 5800 on 0,007 we receive the power of heat losses 40 W. Calibration experiments show that really if to accept 40 W of heat losses, value COP is near 1, but only at the power of heating up to 400 W. However, at higher power of heating to receive at calibration measurements COP = 1, it is necessary to set the power of losses higher – 80 W at the heating power 1000 W. Proceeding from these reasons sizes of losses for four operating modes at the powers about 300, 600, 750 and 900 W 40, 50, 60 and 70 W were accepted. It should be noted that the mistake in the size of heat losses on 10 W gives to mistake definitions COP several percents that is quite admissible."

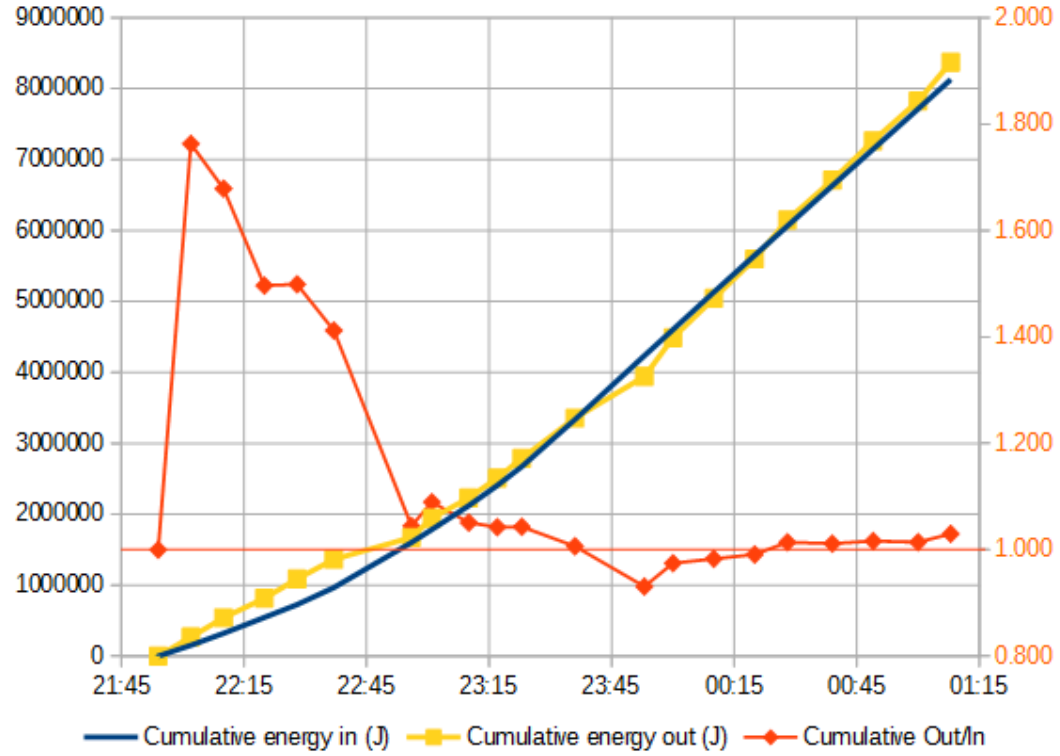
Related videos

Ash samples from previous successful and unsuccessful experiments:
https://youtu.be/XjWqx-BE4p0

Third party data analysis

Excess Heat (by Ecco Yumi)

Regular critical contributor “Ecco” on QuantumHeat.org has done an independent analysis around the likely failure event and has produced the following graph from Dr. Parkhomov’s [publically shared raw data](#).



Ecco comments:

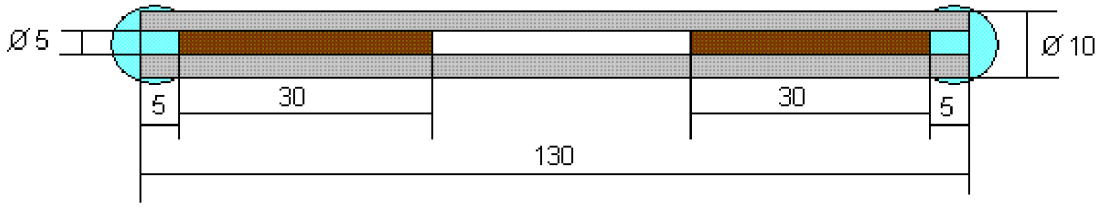
“during the short period where apparently excess heat was being generated, the short term COP just before reactor breakage might have been greater than 1.4. It dropped quickly to ~1 just after reactor breakage (when a loss of heat seemingly occurred).
The time period chosen by Dr. Parkhomov where the COP was ~1.1 was immediately after that event. The one where COP was about 1, included that event. I'm not sure if he's been unlucky or conservative with this choice.”

Maximum reactor pressure (by Alan Goldwater)

The following calculation is a pressure estimate (PRELIMINARY AND SUBJECT TO REVISION) that assumes no leaking from the cell and no ad/absorption by the nickel. It also assumes that all the hydrogen is free rather than being in an ionic molton LiH solution in a dynamic equilibrium.

1. Cell dimensions

Image by courtesy of Dr. Alexander Parkhomov



The volume of the fuel cavity was calculated from the component measurements to be 1.178 ml, assuming the 5 x 30 mm filler rods to be tightly fitted to the tube ID.

2. Fuel formulation and volume

The fuel for this test was reported to be 1.0 g of Ni powder and 0.1 g of LiAlH4 powder. The volume of each component is obtained by the solid density of each:

Ni 1 / 8.98 = 0.111 ml
LiAlH4 0.1 / 0.917 = 0.109 ml

The free volume of the cell is therefore 1.178 – 0.220 = 0.958 ml

3. Corrections for thermal expansion

The linear coefficient of thermal expansion for mullite ($3Al_2O_3 \cdot 2SiO_2$) is 5.4E-6 / °C
The volume after thermal expansion is V (1200 C rise) = 0.958 x 1.096 = 0.977 ml

The thermal volume expansion of the fuel powder is too small to have a relevant effect on the pressure calculation. Elastic expansion of the tube from pressure is not considered here.

4. Pressure calculation

At a reactor temperature of 1220 C reported for this test, 0.10 g of LiAlH4 would have been fully decomposed into the constituent elements. From the standard atomic weights, the mass of hydrogen released would be 0.0106 g. or 4.907E-3 mole of H_2 gas.

Using the Ideal Gas Law the pressure is calculated by

$$P = \frac{nRT}{V}$$

where n = moles of H_2
R = 0.08206 L-atm/mol-°K

$$P = \textbf{616 atm or 9051 psi}$$

5. Van der Waals pressure calculation

   The state equation can be configured to find pressure from known parameters

$$P = \frac{nRT}{V-nb} - \frac{n^2 a}{V^2}$$

where n= 0.004907 mol of H_2
R= 0.08206 L-atm/mol-°K
a = 0.2476 L^2-atm/mol-°K for H_2
b = 0.02661 L/mol for H_2

$$P = \textbf{705 atm or 10356 psi}$$

Hypothesis for reactions and critical temperatures and processes in Parkhomov style experiment based on Piantelli assumption (by Bob W. Greenyer)

http://bit.ly/1xo0HBA

Video of ash samples

In this video, the first dark, sintered ash sample is from an experiment that was calculated to have shown anomalous heat and reached a temperature of around 1100ºC.

The second bluish powder sample reached around 1000ºC before the reactor heater failed. It did not show anomalous heat.

http://youtu.be/XjWqx-BE4p0

Credibility

Worked in traditional nuclear research as career
Very long term study of Neutrino activation of radioactive decay

Suggested improvements to Parkhomov set-up

Combustible gas detector, that way, he should immediately know when he has a reactor breach/failure in the new design.

Power and Harmonics analyser - that way he will get real-time logging of current, voltage, instantaneous and accumulated power. One of these units might make things simpler

http://ebay.to/1ECAp1n have a video recording of it time synced

gravity fed reservoir (rigid polyethylene container) pre-weighed, supported by something like a fish scale

http://www.saveonscales.com/products-page/luggage/scmhs75/

this could have an automatic water control system

http://www.ebay.com/itm/Liquid-Level-Controller-Sensor-Module-Water-Level-Detection-Sensor-brand-new-/390841657093

driving this

http://www.ebay.com/itm/DC3V-6V-5V-Small-Submersible-In-Water-Pump-Fountain-Aquarium-100L-H-Non-clogging-/231402322836?pt=LH_DefaultDomain_0&hash=item35e0a73b94

with an override for the lid fill

With a clock next to the fish scale and a webcam pointed at both recording time and mass, accurate timed recording of water additions could be made

“Garage Style” mass flow calorimeter (MFC)

How about an insulated two pan setup (or similar) like Parkhomov's classic, then have a kind of MFC style circulating pump with flow rate monitoring in and out with temperature monitoring pre-and post.

The simple bit is to have a car radiator with matching fan - can get a set for about $120. The water pump / fan would turn on say 90ºC. Other than a little evaporation, it would be a closed loop. Could form the basis of a heater!

http://ebay.to/1MUw6oo

http://ebay.to/1CHLhhT

One team, sponsored by a Russian registered entity "LockTherm LLC", again with no luxury of a glovebox, is taking a very different approach to their experiments and has developed a very ingenious method of pressing pellets for their reactors. The technique is very valuable to would be replicators and has many advantages, it makes powder mixes less likely to

1. loft (i.e. reduce likely hood of particles in air after pressing, protecting operators)
2. react with moisture through the bulk

It also makes them far easier to pre-package and distribute and easier to handle predictably insert into a reactor without distributing powder in other places inside the tube as we have previously encountered. This may make it more possible for the MFMP to send out kits.

Lastly, it is affordable and accessible because it is about as 'garage' as you can do things - it is based on a car jack!

http://youtu.be/10nStfVm8EQ

What was / was not known of key materials

Much of what Dr. Parkhomov has been using was old or excess stock that his friends and associates had at their disposal. For this reason, specific sources were unknown to him.

LiAlH4 - source unknown, but not thought to be important, Sigma Aldrich should be of sufficient quality.

Here is a source that provides LiAlH4 samples in pellet form of unknown quality.
http://www.alibaba.com/product-detail/Sample-Available-Lithium-Aluminium-Hydride_60134035831.html

You can also get LiAlH4 from eBay at:
http://ebay.to/19Nyv6u

in reagent grade. It is 100g for $125 with free shipping. Chemical supply houses, want to charge $150 for hazardous shipping. Note that 100g is enough for about 1000 experiments - I.E. a lot. You could easily subdivide among groups.

Nickel powder - the nature of the Nickel powder used in tests up till the 27th Feb 2015 was unknown, however 1g has been reserved for analysis. Commercially available Nickel powder as detailed above has apparently showed good performance. A sample of this was given to the MFMP and we intend to characterise and test it.

Ceramic tubes - the supplier was unknown as it was ex-stock, however it was established that they were just 50% Alumina and the rest silicates as discussed above.

Heater coils - Up until the 27th February, NiChrome heater wire was used, since then FeCrAl (Domestic Russian Kanthal A1 equivalent) has been used with apparent success.

The sealing materials and process is detailed above.

Possible mechanism assuming Piantelli

https://goo.gl/iipdNL