Behavior of metal micropowders in electrolytic plasma and under pulsed solicitation

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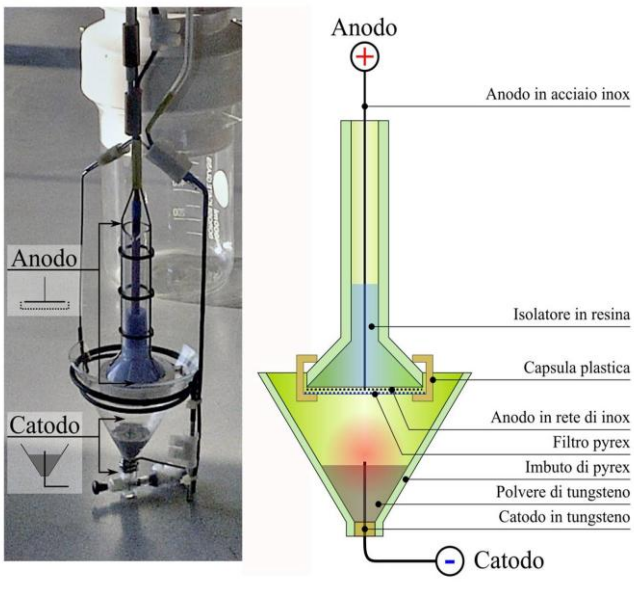
Abstract

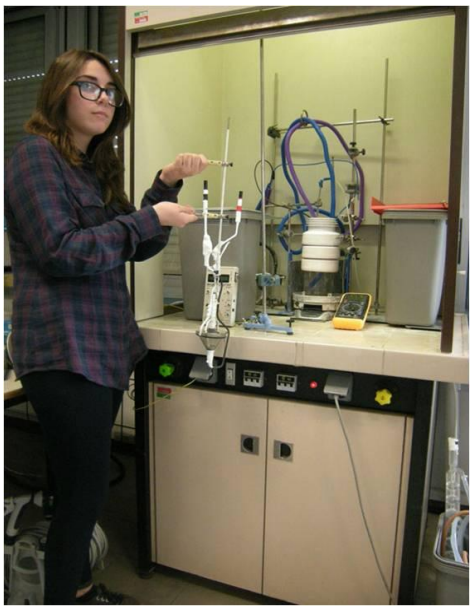
With the goal of determining the conditions to promote some anomalous effects (thermal and electrical) shown by metals in the presence of hydrogen gas or during electrolytic evolution, we focused the attention on the use of high voltage, narrow electric pulses, with low repetition rate, on small sized metal powders.

The experimental data collected during the experimentation, relative to cathodes made from tungsten micrometric powders subjected to electrolytic regime (solutions of K_2CO_3) at voltages up to 350 V and the average power of 200-300 W, show the *spontaneous* formation of pulses of high instantaneous power, up to 30 - 40 KW, in conjunction with abnormal development of heat.

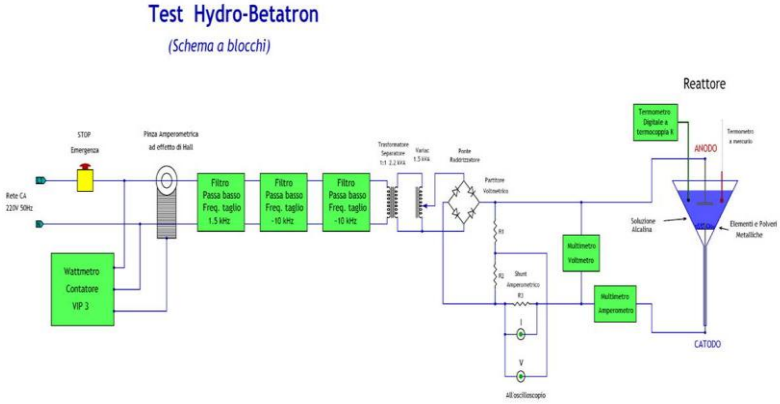
These data have suggested the design of a suitable reactor and its experimental set-up, for the extension of the experimentation to micrometric powders made from different metals, subjected to *programmed* high voltage narrow impulsive discharges, in the hydrogen gas. Some results of the experiments, conducted varying the composition and particle size of the metal powders, the hydrogen pressure and the characteristics of impulsive discharges, are shown.

In 2012, in the Physics Lab at "L. Pirelli" High School, in Rome an experimentation begins by a group of teachers and students.



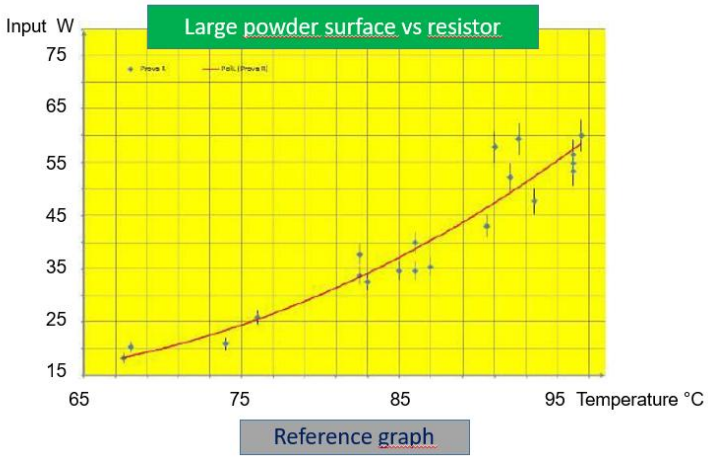


At *J. Von Neumann Foundation* Lab in Rome the experimentation has continued with a new reactor more strong and controlled.



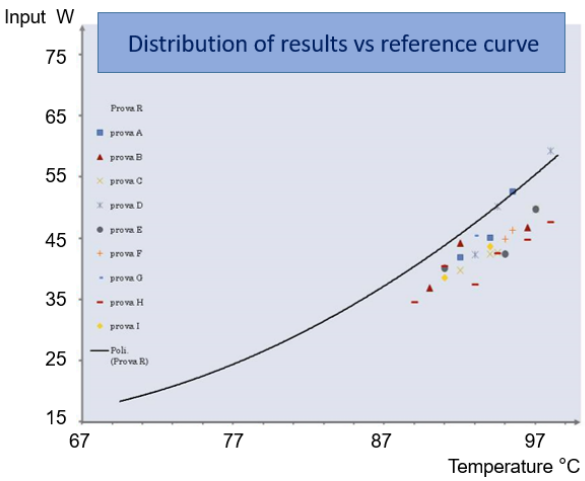
From **Athanor** to its heir **Hydrobetatron 1.0** reactor (special powder cathode)

The result of the experimental campaign is shown below, referred to a purely resistive test.



Sample composition **run R (reference) – no plasma**

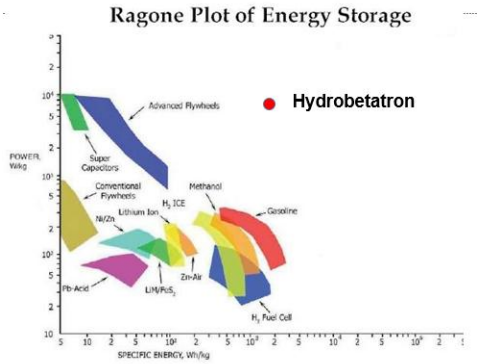
Grains /Powders	0g	1g	2g	3g
0g	A	B	C	
1g	D	E	F	
2g	G	H	I	
3g				R



Subject: LENR **heat anomaly** **in electrolytic plasma**

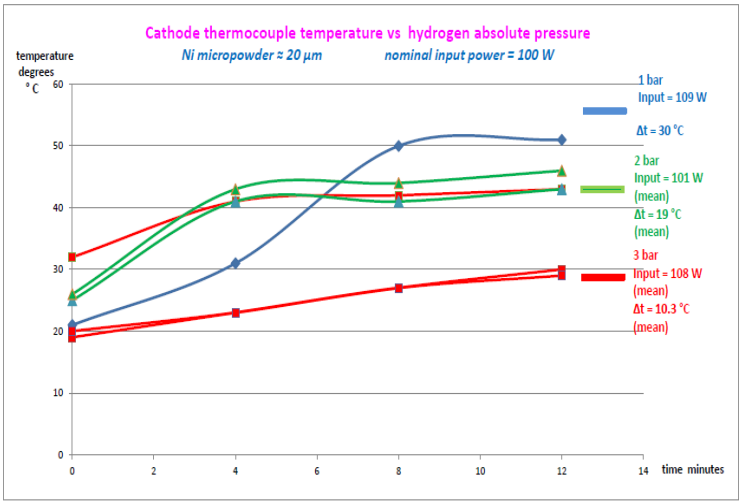
Excitation mode: electrical, DC
Equilibrium temperature after 10 minutes
Mean input power **38 W**
Mean output power **48 W**
COP (definition) = reference power/input power **Max COP = 1.26**
Input energy 22800 J
Output energy 28800 J
Excess energy 6000J

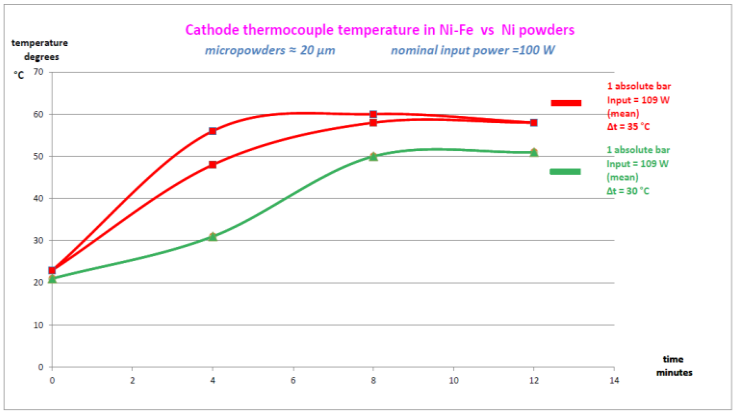
Power density 10000 W/Kg
Specific energy 1650 Wh/Kg

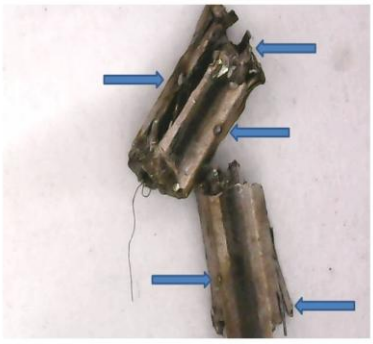


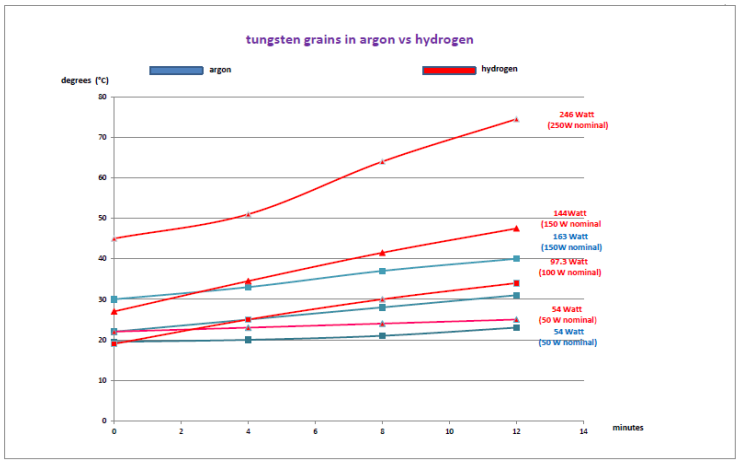
Actually (**Hydrobetatron 2.0**) experimentation is continuing by studying about the effect of a deliberately pulsed solicitation, variable in amplitude, ascent slope, pulse duration, repetition frequency, duty-cycle (proprietary pulse device) on micrometric composite structures (sintered cathodes from multicomponent powders, electroplated multilayers, and so on) both in electrolytic or hydrogen plasmas, under the effect of magnetic field. The selected pictures show the effect of pressure, cathode composition, gas composition.

Below the images of reactor in action and tungsten cylinder after reaction with craters and cracks.









Conclusions

The experimental work about **Nuclear Synthesis** should continue trying to accomplish *highly unlikely configurations*, quickly decaying towards conditions at decreasing information content, sustaining isolated high fluctuation frequencies (B. Ahern's *energy localization*).

After the shown preliminary results, a deeper cooperative research in the drawn direction should appear now fully justified.

Sitography

1. P.Soininen, in (http://www.google.com/patents/WO2013076378A2?cl=en&hl=it)
   shows a simulation extracted from http://juluribk.com/2011/04/09/electric-field-in-metal-nanoparticle-dimers/ in which are expected electric fields, in the neighborhood of the gaps between nanoparticles, up to four orders of magnitude greater than the mean field.

2. The addition of pyro-piezoelectric materials, or magnetoelectric, that P.Soininen in his patent (http://www.google.com/patents/WO2013076378A2?cl=en&hl=it) proposes to self-generate electrical pulses due to thermal gradients, can be conveniently examined in the light of the inverse effects, to generate localized concentrations of energy induced by pulsed electrical supply.

3. F. Celani, G. Vassallo et al. agree (ICCF18, July 2013) (http://www.francescocelanienergy.org/files/Presen_Finale-ICCF18Celani_E.pdf) both theoretically and experimentally with the vision of Ahern about the importance of pulse-solicited nanostructures.

4. B. Ahern (May 1995) (http://www.archpatent.com/patents/5411654) shows, among others, examples of alternating nanolayers Cu / Ni and Ni / Pd subjected to pulsed electrolysis.

5. G.H. Miley (November 2013) (http://www.google.com/patents/US20130295512) reported excess heat in alternating nanolayers, eg. Ni / Ti, Ni / Ag (with the addition of interlayer nanoparticles) when subjected, in the electrolysis, to rapid variations in voltage at the extremes.

6. Iorio-Cirillo cell, the monolithic cathode is activated after a conditioning in plasma, during which surface defects are developed (http://www.progettomeg.it/all/relazione10.04.pdf

7. Even during the trial at "L. Pirelli" Instruction Institute it was found that cathodes "used" showed effects more showy, as confirmed independently by P. Clauzon et al. (http://jlnlabs.online.fr/cfr/nfrcnam/NFR_CNAM.pdf)

8. In the recent patent US Navy US8419919 (https://www.google.com/patents/US8419919)
   P.A. Boss reports about the deposition of a layer of porous nanostructured Palladium on Gold.

9. T. Mizuno (http://lenr-canr.org/acrobat/YoshinoHreplicable.pdf) activates a grid of Nickel by discharge plasma that makes nanostructured the surface.

ACKNOWLEDGEMENTS

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