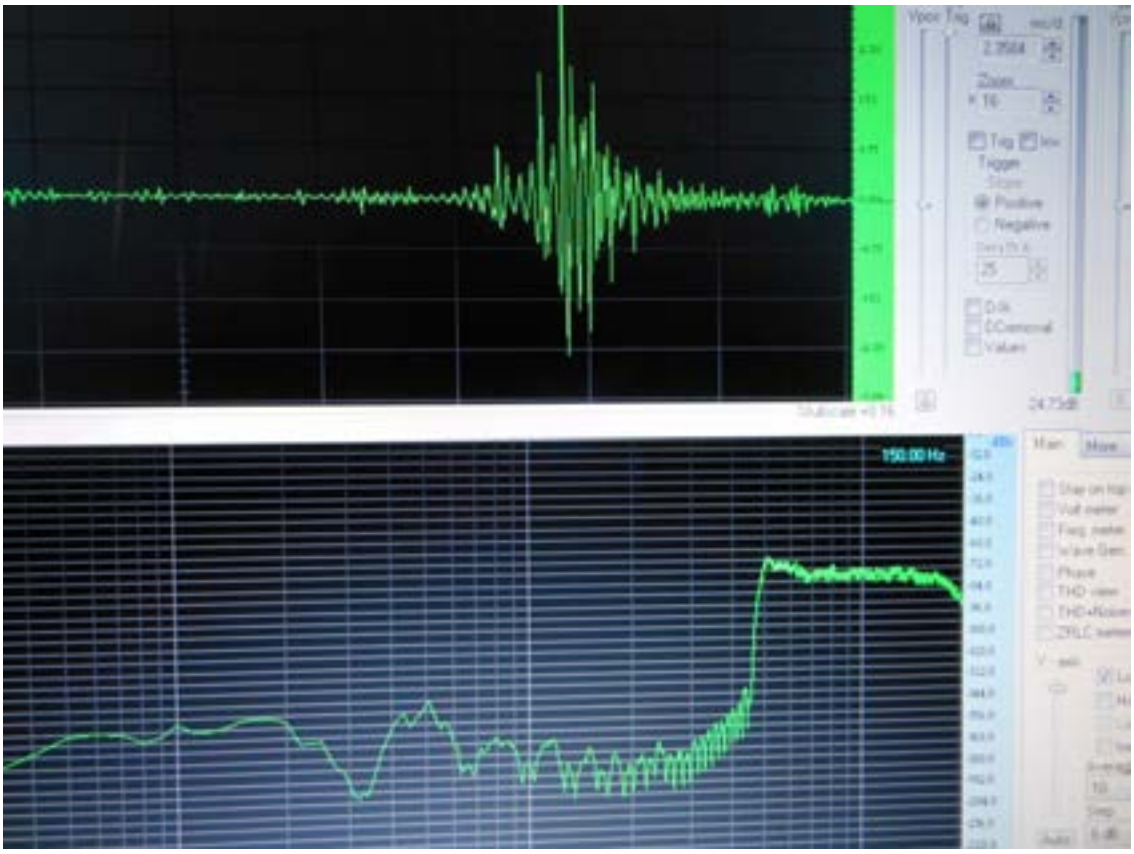
Role of Lithium in LENR – *Part three*

Electroinduced Cavitation in liquid Lithium



Acoustic detecting during pulsed electrical stress in electrolysis (archive Open Power)

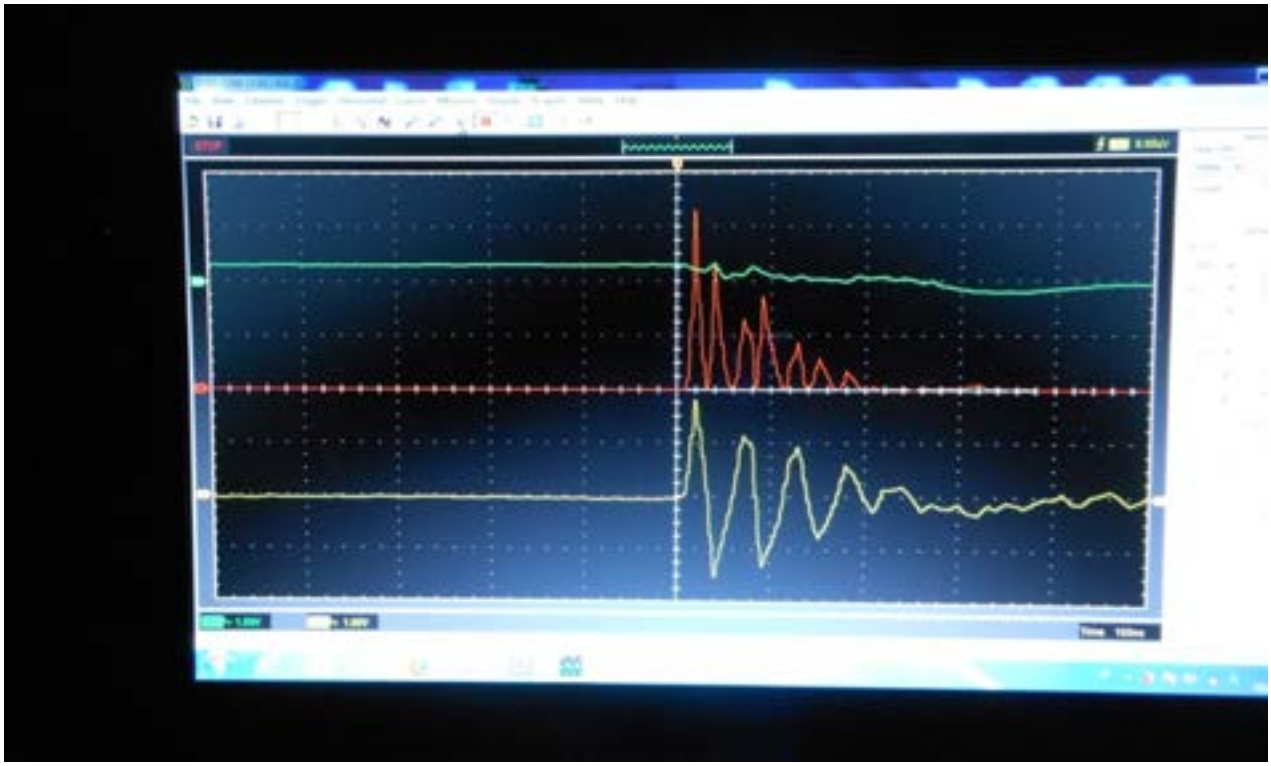
About cavitation a wide literature is available, and many applications are in the LENR field.

In Italy have been carried out *fundamental* researchworks, among others, by prof. F. Cardone; they can provide a key to justify "piezonuclear phenomena" of A. Carpinteri.

The basic concept is related to the enormous pressures that develop during instantaneous implosion of the bubbles contained in a material when stressed by ultrasound.

The phenomenon strongly depends on the speed of sound in the medium, and higher speeds produce higher pressures.

The current experimental campaign in progress at the ***Open Power*** laboratory, **covered by patent application**, provides for stressing the target material by means of narrow and very high electrical pulses, repeated at low-frequency, capable of providing *instantaneous* powers of the order of several Megawatts that, averaged over time, correspond to a total power below 100 watts.

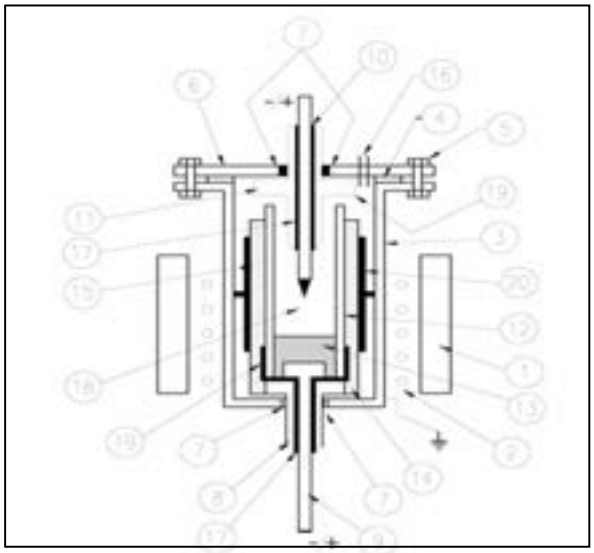


Detection of spontaneous pulses under direct 200 Volt supply during electrolysis (scale 100 nsec);

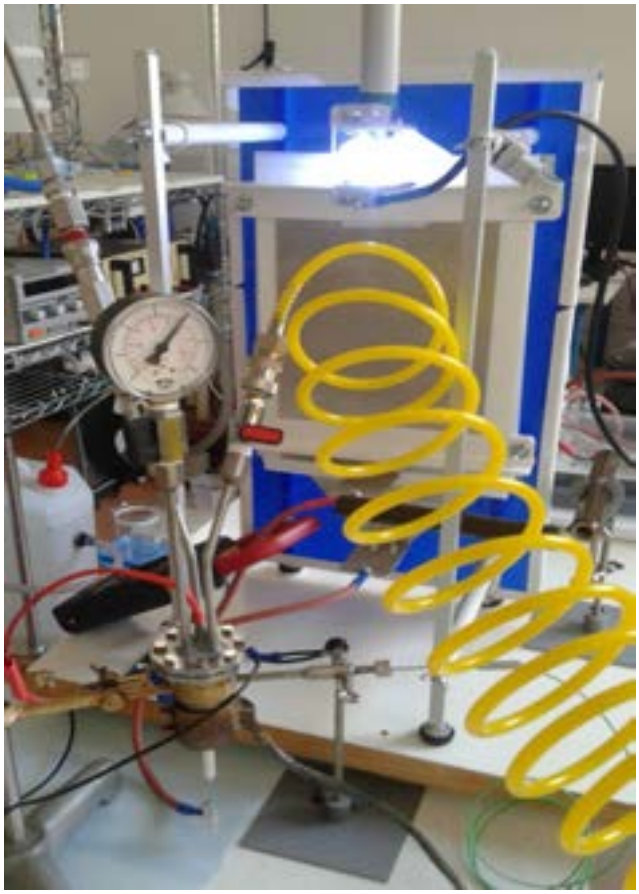
the production may be traced back to the fluctuations of conductivity of cathode powders

We believe that the excess heat detected since our first *electrolytic* experiments (2012), can be traced back to cavitation, induced by the **spontaneous** impulsive electrical discharges detected.

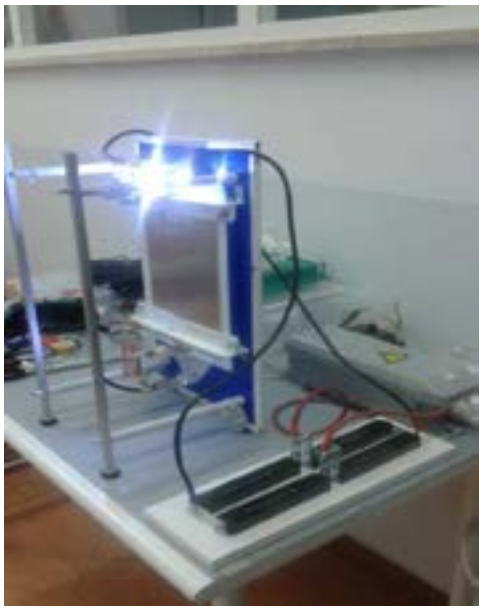
The current campaign, that we are carrying out by **designed** impulsive discharges in the atmosphere of *gaseous* hydrogen, is ***currently using*** one of the reactors described in the **mentioned patent application**:



Linear reactor



In the pictures are evident, among other things, the heater in the lower part of the reaction chamber, the gas connections, and the pulsing power supply of type "Blumlein Line"



Subsequently, a most recent apparatus for the production of pulses has been designed, as mentioned, to provide instantaneous powers of the order of Megawatts; it will be used to solicit ***biphasic mixtures*** (liquid / suspension) referred to the ***claims*** of the cited patent, and is currently under test.

A fundamental patent on the subject of cavitation, ***H.Flynn, "Method of generating energy by acoustically induced cavitation fusion and reactor therefor"*** (http://www.google.com/patents/US4333796) describes the possibility of ***acoustically*** soliciting a particular liquid, the **Lithium** (melting temperature of about 180°C), in order to the formation of cavitation effects in bubbles of hydrogen isotopes trapped in the liquid mass, functional for obtaining enormous instantaneous pressures, capable of carrying out both fusion of such isotopes and to involve the element Lithium (in the form of its isotopes of atomic mass 6 and 7) as ***fuel*** in reactions with neutrons and protons.

See previous parts ***one*** and ***two (Role of Lithium in LENR)*** for the details of this involvement, very important because of the exothermic character of the reaction, of the order of several ***MeV***.

Flynn stresses that the high speed of sound in the liquid Lithium makes this material particularly suitable to cavitation, and stresses to be of interest to improve the properties of Lithium by alloying it with beryllium (or aluminum) in order to lower the overall vapor pressure near the point of fusion.

The evaluation about the decision if use pure or lithium alloy must be made taking into account the increased temperature to be maintained in the reaction chamber (in the second case) to ensure the presence of liquid phase.

Therefore the proposed experimentation, to be conducted **in the patented reactor**, plans to put nanoparticles of Nickel and Iron in suspension in the liquid lithium, and soliciting the mixture by impulsive discharges to promote cavitation in the material.

The materials, all conductors, can be placed in the cathode region to benefit from the interelectrode potential difference for the purpose of the enrichment of the mixture in electro-compressed protons , or in the anode region to constitute the target for the flow of electrons.

Any neutrons produced, in addition to protons, would find ***on site*** (at the interfaces between the Lithium and other materials) some Lithium available as *nuclear fuel*, without neglecting the opportunity that this method offers also in respect of considering in the same implosion the *fuels* Nickel- Iron and isotopes of hydrogen.

The experimentation just outlined is inspired by an attempt to avoid **average** temperatures so high that seem to be necessary in the E-Cat and replies, to the advantage of easier construction, maintainability and real feasibility of testing in different conditions, without the oppressive constraint about apparatus endurance.

Therefore, given the presumed presence (at least judging from the relative report) of lithium in the charge of E-Cat, it seems reasonable the hypothesis that at least in a range of temperatures during the heating phase,

the lithium is in alloy with the Aluminium, after hydrogen releasing, in liquid phase, to permeate the matrix of Nickel; what makes it interesting to experience also in reactors *Parkhomov-like* the effect of the application of impulsive electrical stress.

First Open Power reactor, *Parkhomov-like* (during a test)

In particular, since Open Power is assembling a **second** reactor, in collaboration with the researchers of Martin Fleischmann Memorial Project, for the replicas of the experiences of Parkhomov in conditions of high security, flexibility and controllability, this reactor will be also equipped with a pair of electrodes, to compare its behavior both in the absence and in the presence of impulsive stress.

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