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Organic enhancer catalysts in Ni-H Lenr reactions: a successful duplication of the Rossi-Focardi LENR device (Summer N-Physics Lab, Lake Morey College, Fairlee, VT).

Abstract.
The present paper takes into consideration different types of organic catalysts in Ni-H Low Energy Nuclear Reactions (LENR), of the type described, among others, by Focardi et al. 1998 and Campari et al., 2004, and more recently developed for industrial use by Rossi (Focardi-Rossi 2010; see also assesment of results in Levi 2011), wherein a catalyst currently covered by industrial secret is used in order to enhance the production of heat. The authors of the present paper describe the results obtained by doping Ni micropowders with different kinds of catalysts of organic (processed vegetable and animal) origin, thereby duplicating or bettering Rossi's result. Results were obtained at the Summer N-Physics Lab, Lake Morey College, Fairlee VT in June-July 2012.

1. Introduction.

While the process which allows intense emissions of heat in the order of 5-6 kWh vs. an average input of 300 W of electrical power through a coil resistor is not well understood, the prime candidate, the so-called Widom-Larsen theory (Srivastava et al. 2008) being only one of the competing theoretical outlooks, it is by now well-established that the anomalous heat production in the kW order of magnitude does indeed occur. Questions have been raised over the nature and property of the catalyst used in the so-called Rossi-Focardi "ECat" reactor, currently subject to lengthy patent procedures in the EU after the release of the Italian patent in 2011.

The present authors have taken into consideration the physical location of Rossi's laboratories in Northern Italy. These are both situated in the administrative region of Emilia-Romagna, in the Bologna area (fig.1) while forming part of a larger section of territory sometimes known, in somewhat controversial political circles, as "Padania" from the Po valley which encompasses it.

This general area is well-served by local transportation, both on the North-South axis connecting Milan with Rome and Ancona through the Bologna hub, the A1 highway and the A14 to the South-East, as well as

on the West-to-East A13 axis connecting Bologna and Venice.The preliminary question posed by the authors may thus be broadly reduced to the following: what special and distinctive materials were originally available to Rossi & Focardi which allowed them to make the "qualitative leap" which brought the ECat from the realms of theoretical physics well into the world of industrial application?

The following materials were taken into consideration, as being both readily available and well-known for their energizing properties among the local populations:

a. Dilute solutions of fermented grape juices (11-13° Ethanol content), usually belonging to the following denominations: Lambrusco, Sangiovese, Cagnina, Pignoletto. The supermarket variety, Tavernello, was also taken into consideration.

b. Distilled versions of the former (44-48° ethanol content, traces of methanol in homemade varieties), labeled under the general name of Grappa, Sgnappa, Latte di Gallina, etc.

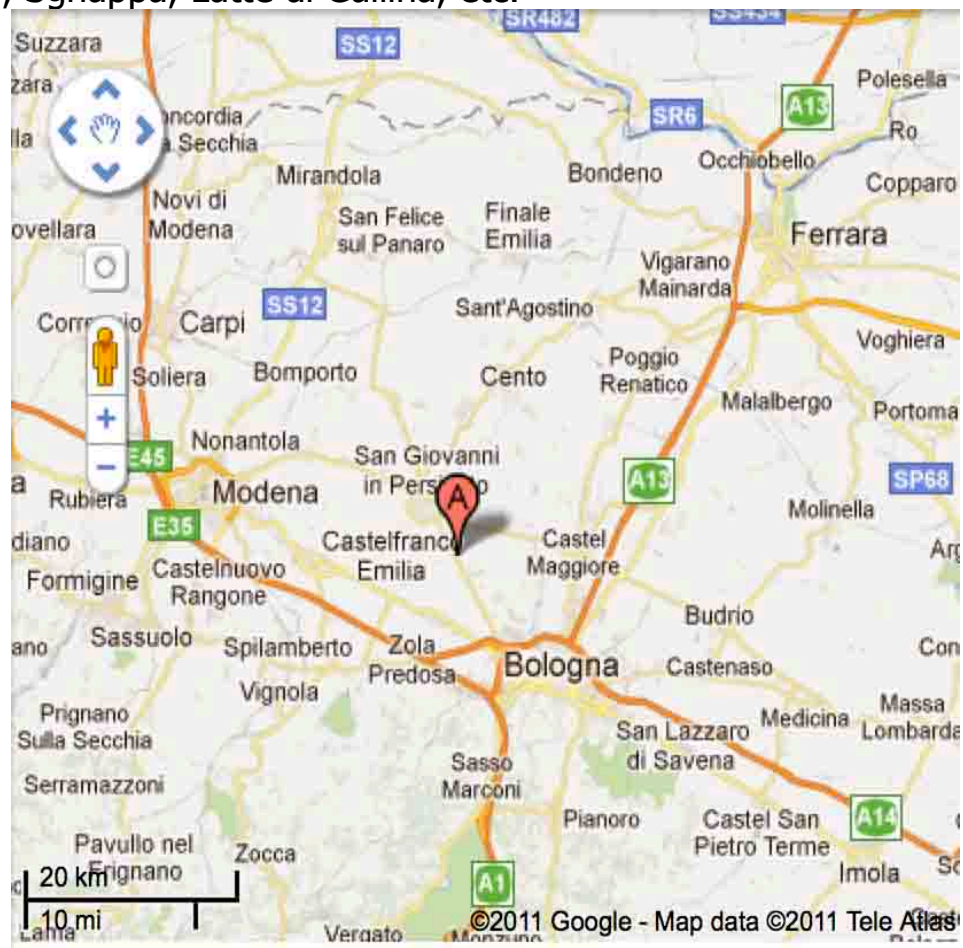

Fig 1. Andrea Rossi's operations territory: Bologna is at the lower center.

c. Various forms of cured pork meat: Prosciutto, Culatello, Salame, Salama da Sugo, Ciccioli; all these were subsequently discarded in favor of the prime local product, Mortadella (also known somewhat

erroneously as Bologna): as this cold meat is actually a composite product including diverse admixtures of pork, it was considered the prime candidate for the unknown catalyst in this class of substances.
d. Local cheeses, preferably in powdered form. The denominations to be taken into consideration were reduced to the universally accepted varieties: Grana, Parmigiano Reggiano, Pecorino, Formaggio di Fossa. (fig. 2)
All these organic substances were traditionally much valued by the native population as energetic supplements to a poor staple diet of pasta, polenta, and occasional chestnuts.[1] It was felt that given Rossi's Northern Italian origins and his elective choice of Emilia-Romagna as the preferred area in which to conduct his experiments, it would be possible to apply the general rule of thumb according to which "what is good for the goose is good for the gander": the likelihood of one of these probable prime supplements to Rossi's daily diet being used also to enhance the performance of his ECat was taken as a reasonable working hypothesis.

Fig. 2. Partial overlap of Parmigiano Cheese production area with fig. 1 above.

2. Apparatus, methods and initial procedure.

Given the lack of a detailed model of the ECat, the authors referred to the hypothetical model presented by GUIDI 2011 in fig. 3 below. The apparatus was redesigned to facilitate the insertion of the supposed

[1] Pellagra, once rampant even in affluent families, as Goethe remarked in his travels through the country in the 18th Century, has by now been completely eradicated through better diet and television.

catalysts in the reaction chamber by means of a trap-door operated by our trained mole Englebert.

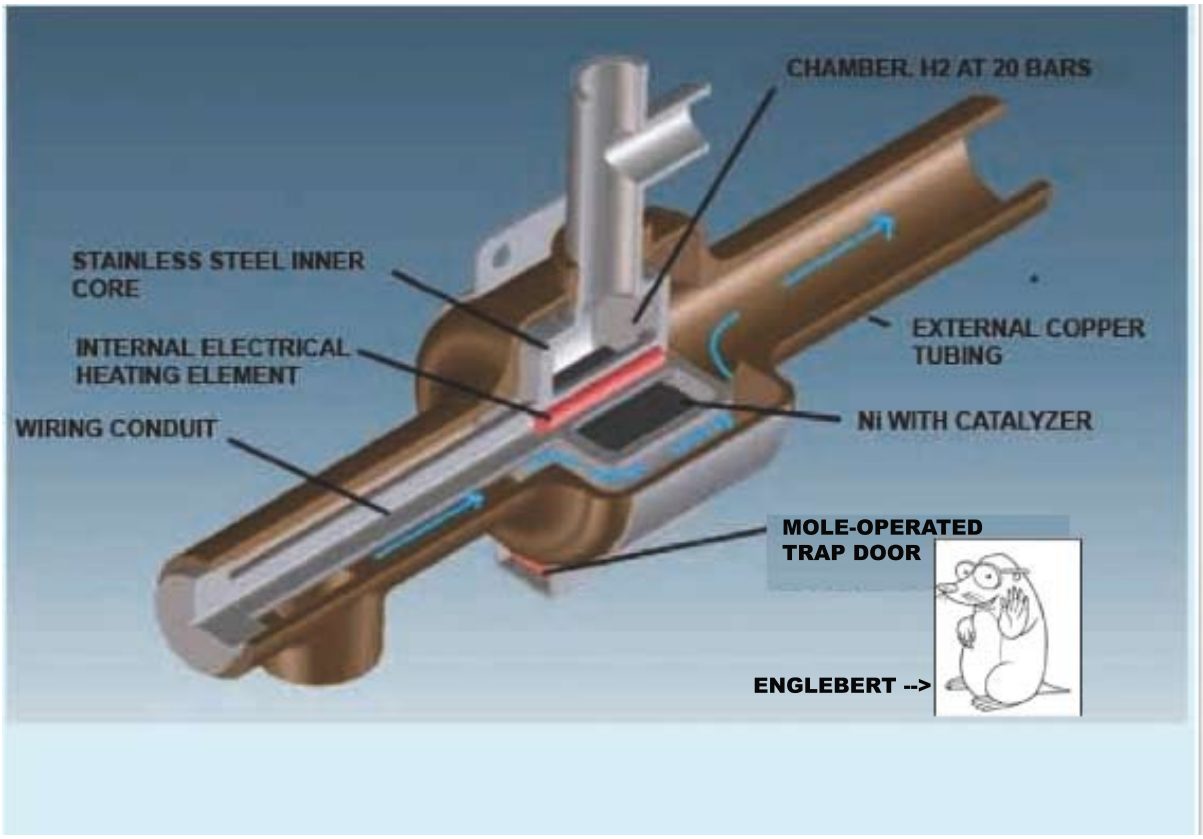

Fig. 3: experimentall E-Cat model.

The section on the left-hand side of the device was connected by a pressure reducer to a hydrogen bottle, obtained from a retired party balloon vendor.[2] The wire for the heater coil was obtained by dismantling Mrs. Formaggia's hairdrier; cooling water was measured at 21° C and came from the Maguires' garden hose. All shutoff valves and stopcocks were obtained from Mr. Harvey Moot's hardware & plumbing shop at 15 Ely Road, Fairlee VT.

A rectal thermometer was inserted into the upper part of the housing to monitor temperature changes, which were dutifully recorded on a high-school copybook.

In the initial, control phases of the experiment, Englebert was instructed to insert a 15 g. sample of Ni micropowder (Ø 0.48 μ) into the trap door under the reaction chamber. The reactor was switched on, and seen to rise to a temperature of approximately 98° C, with a constant power expenditure of 300 W ± 5%; temperature readings were taken at 1 min. intervals; upon reaching 98° no further increases of temperature were

[2] Mr. Jerome Higgs, who gracefully consented the use of his 1970 vintage 180 Atm. hydrogen bottle provided he be cited in the acknowledgements of this paper. Mr. Higgs was put out of business in 1973, when security considerations made it mandatory to use helium instead of hydrogen for filling toy balloons at fairs and parties in general.

noticed, the device having reached a state of thermal equilibrium, dispersing heat into the environment (fig. 4). The rise in temperature is approximately linear.

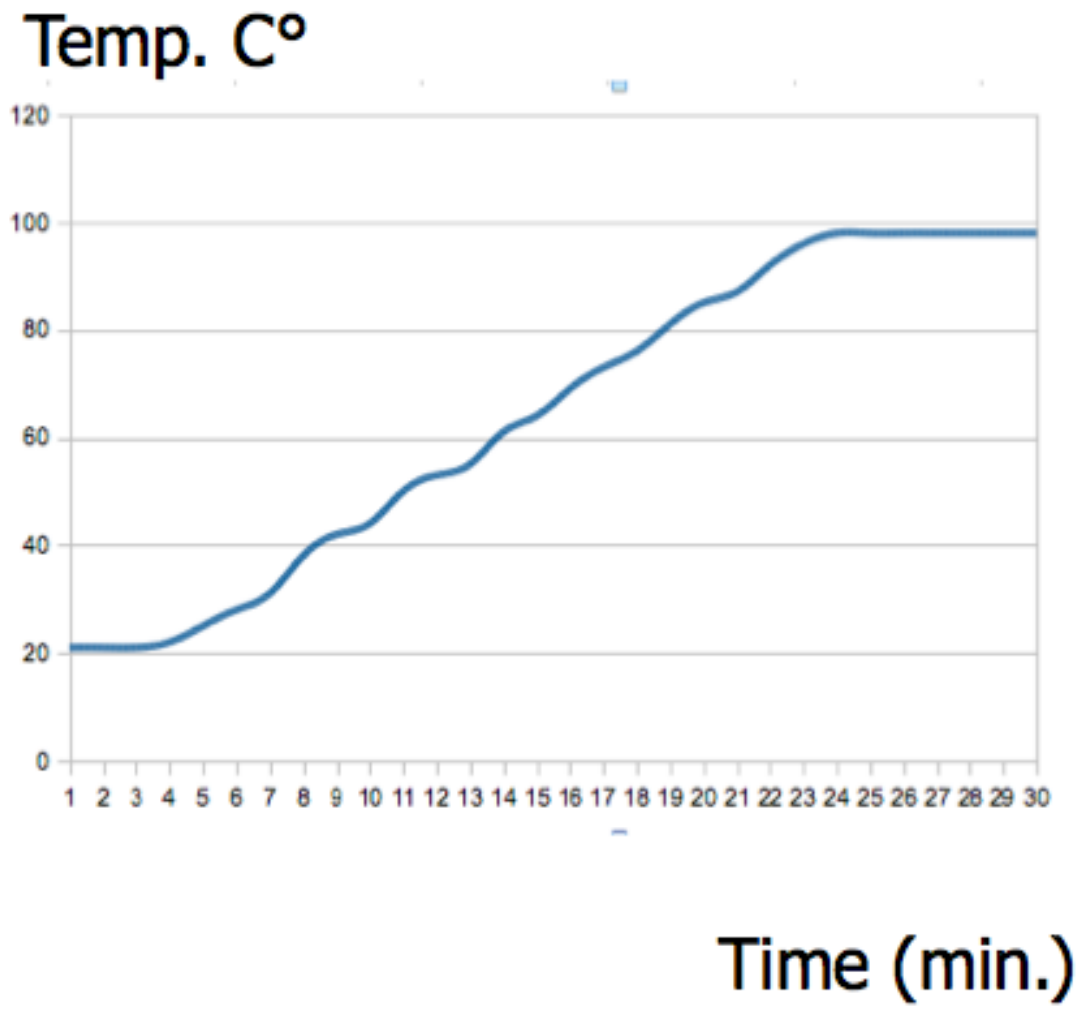

Fig. 4. Control Run.

3. The Experiment

The following stage of the experiment consisted in determining the quality and quantity of the hypothetical catalyst, on the basis of the theoretical assumptions delineated above.

For a period of about 15 days, repeated experiments were conducted with the reactor, introducing in each case a controlled quantity (1 mg) of each of the catalysts. The more promising ones turned out to be Lambrusco and Mortadella, closely followed by Parmigiano Reggiano; Prosciutto, Salama da Sugo, as well as Grappa and other spirits surprisingly did not give promising results, suggesting some local influence in the determination of the optimal process. It is moreover noteworthy that no differentiation in the different brands of produce seemed to make any difference, wheras the place of origin did. Modena

Lambrusco for instance, yielded the highest results, and so did Parmigiano produced at an altitude of over 600 mt., whereas Mortadella maufactured and packed outside of Bologna performed very poorly.
As a consequence of the preliminary tests, a mixture was prepared consisting of 1/3 Lambrusco, 1/3 Mortadella, 1/3 Parmigiano (aged 24 months) in weight. The resulting paste was blended in a Moulinex Osterizer, weighed out in 1 mg samples, and added to the 15 g. Ni powder charges. Prepared fuel charges were then deep-frozen to avoid bacterial contamination, and the final testing process was initiated.
Englebert the Mole was instructed to place the composite mixture together with the Ni powder into the reactor trap-door, and fifty 30-minute runs of the reactor were carried out sequentially. In the following diagram (fig. 5) the highest (blue) and lowest (red) single results are shown, as well as the overall average (yellow). In all cases, the reactor topped off at 100 C°, making plenty of boiling water for the experimenters' coffee breaks.[3]

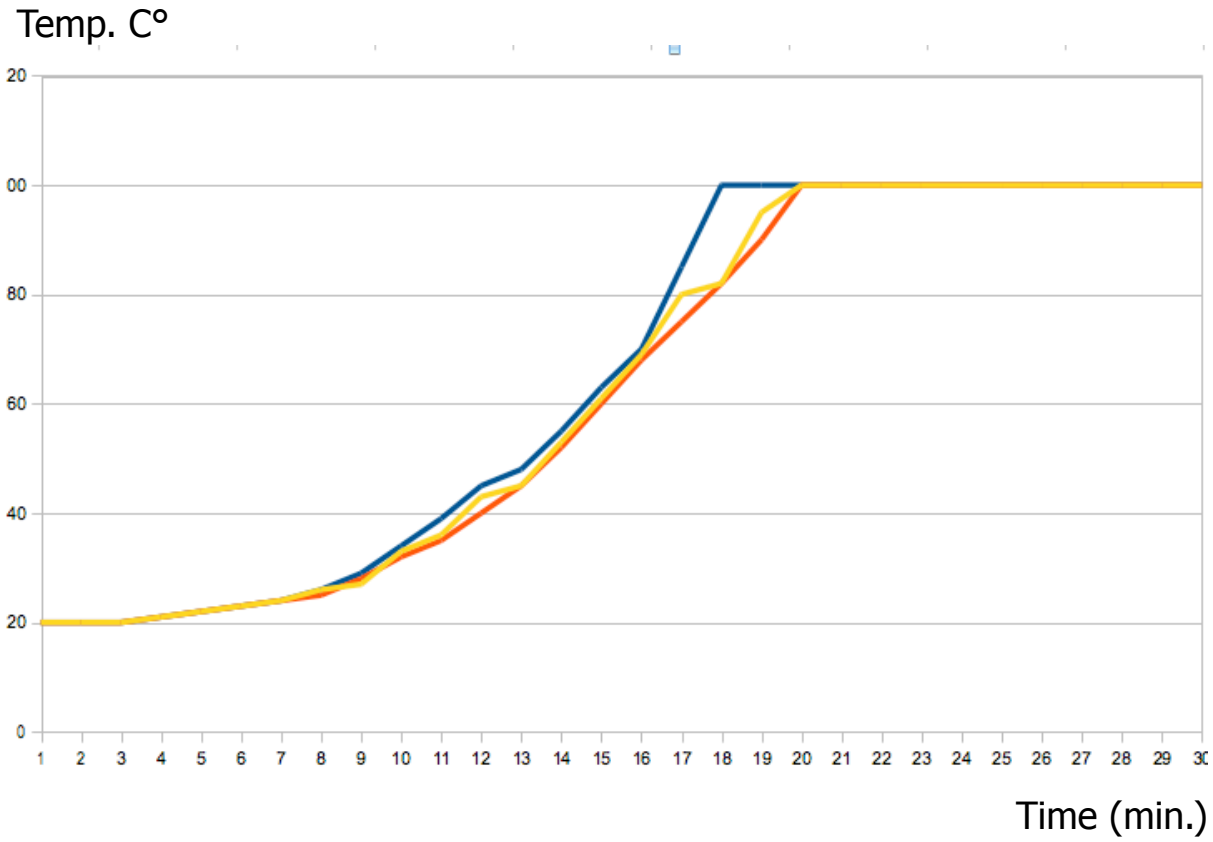

Fig. 5: lowest, mean and highest yields for 30 min. runs.

[3] Englebert was rewarded with plentiful helpings of the leftover caralyst, gaining well over 100 g. in the three days it took to run the experiment.

4. Conclusions

The non-linear heat rise in the reactor runs is obvious, as well as the fact that the the original equilibrium of the test runs was overruled and the device and began producing steam at at 18-20 mins. after ignition, compared to the levelling out at 98° after ca. 24 mins. in the test runs. There is considerable hesitation in the interpretation of the different yields of the experimental trial (no two runs gave exactly the same result), which have been tentatively linked to the amount of garlic contained in the Mortadella or — alternatively — to the amount of ethanol in the experimenters' bloodstream; nor is there yet a plausible theory on why this device configuration should operate at all.

But all in all, the authors feel that they have provided an ample and sufficient proof as to the funcionality of the Rossi-Focardi E-Cat, as well as an interesting lead to further experimentation. Further studies are needed in order to measure the thermal kW production precisely, as well the possibility of expanding the catalyst possibilities to other realms of technology.

5. References.

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