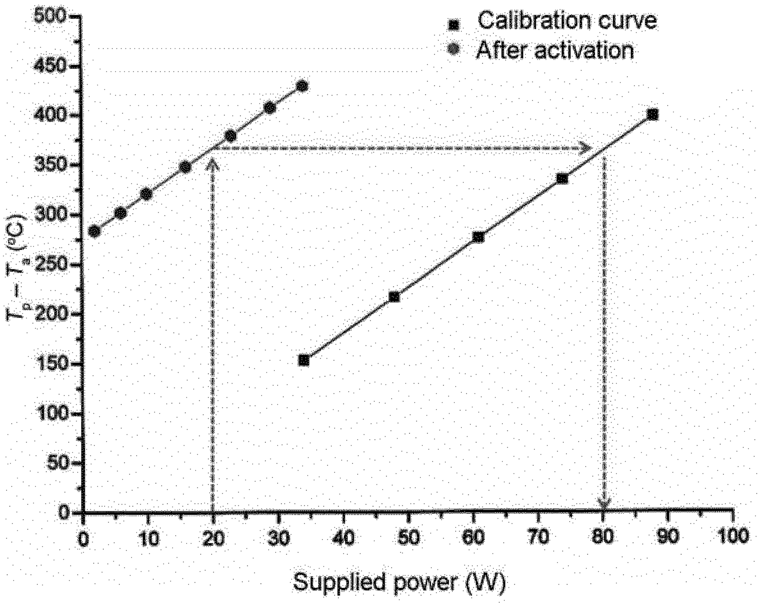
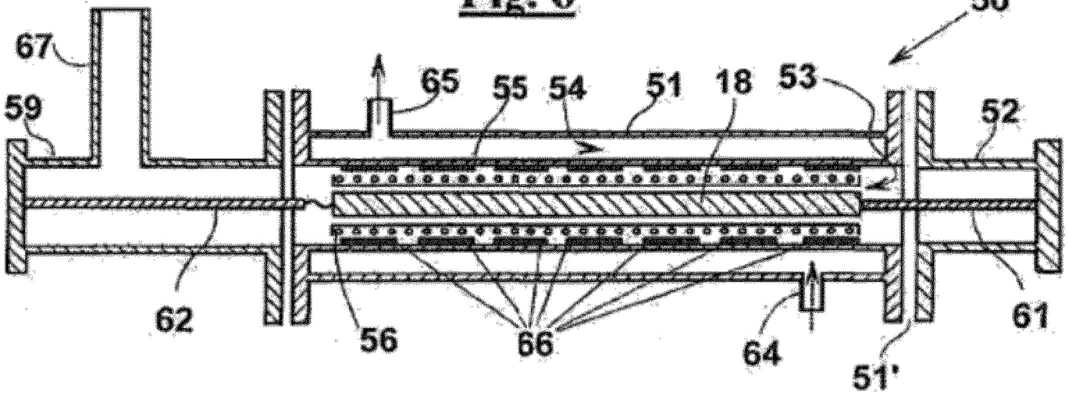


Temperature (T_p) in the core of the experiment relative to ambient temperature (T_a) for two cases, a calibration curve and a Ni rod that had been activated. Only 20 W of input power is needed for the activated rod to attain the same temperature as produced by 80 W of power input for the calibration run. This indicates an excess power of 60 W for the 20 W of input electrical power.

It is seen that the comparison of temperatures for the calibration run, with those from an experiment with activated Ni material, indicates an excess power of 60 W. Therefore, the initial experimental results show that heat is generated with a cell as described in prior art document D1.

2.2 Experimental Data relative to the Patent

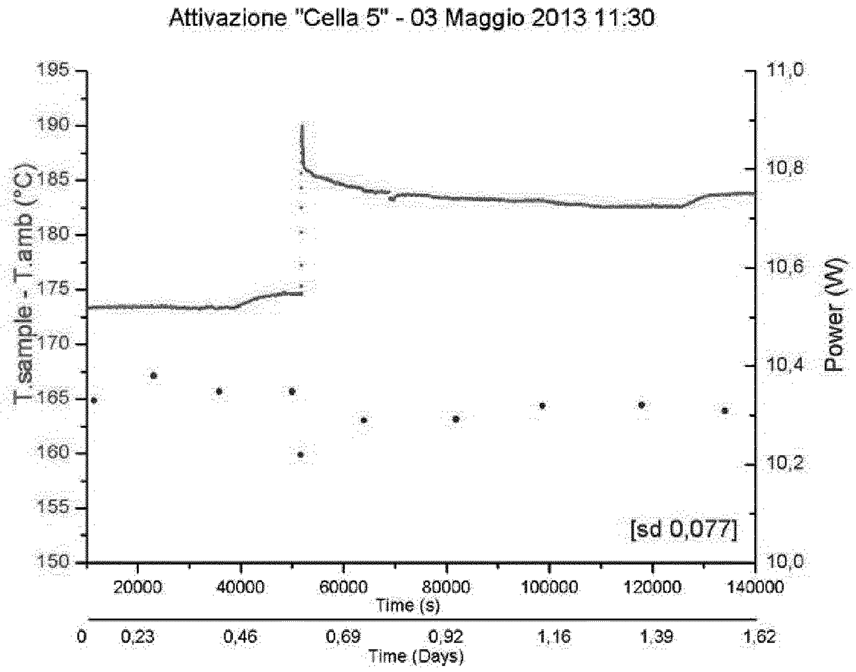
In the following, we shall present experimental data obtained by the patent proprietor in 2013-2015 with a system like the one shown in Figures 6 of the patent, reproduced below. Two cells were continuously operated in said period, at the end of which one cell was stopped to extract and investigate the core, while the other is still running.



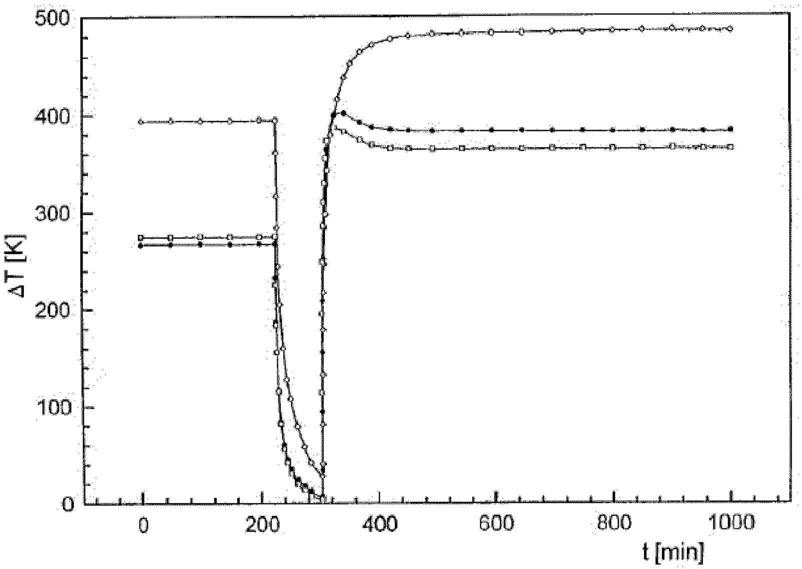
Schematic representation of the apparatus of the patent, employed for obtaining the data shown below

The experimental apparatus is already described in the present patent and in D1 (this patent publication by the proprietor is very detailed as to the cell), but we shall briefly summarize its features. The cell vessel is a stainless steel tube ending with commercial vacuum fittings, and the inner volume of the cell is provided with a heater (Ni-Cr wire wound around a ceramic tube) supplied by a stabilized DC power supply. The cell contains a special nickel rod 18 that has been provided with a type K thermocouple (not shown in the figure above) (sensitivity 10μV/K at 700 K), one end of which is fixed to the external surface of the rod and the other is placed in a Dewar. The nickel rod comprises nano-crystalline clusters of nickel atoms, and has been loaded in the cell in a hydrogen atmosphere for about 2 hours until the hydrogen pressure did no longer drop.

The device was then operated and slowly heated to a process temperature of about 700 K, supplying between 70 and 170 W of power to the heater. Triggering was effected in this case by an electrical voltage pulse, while in earlier published experiments it was achieved by thermal cycling, i.e. abruptly switching off the heater, waiting for the temperature to drop to 300 K, and then switching the heater on again, restoring its previous power level. The effects on the temperature/power values plotted versus time are shown below:



Temperature of Ni rod (as difference to ambient T) and power level versus time; at about 50000s, an electric trigger pulse was sent through the cell leading to a temperature increase at constant/slowly decreasing input power level



Temperature jumps of a Ni rod used in previous experiments after thermal triggering at 200 min at several positions along the rod; again temperatures increased after triggering (from Annex 2)

From the temperature vs. power calibration data, it was thus possible to determine the excess power corresponding to the observed excess temperature, which was in the range of 70 W for 29 W of input power.

Thus, the published results (Annex 2) about large excess heat production in Ni-H systems have been confirmed also in the latest (and still running) experiments (data above).

Coming to the question of the physical phenomena involved, we admit that the exact mechanism is not yet completely understood, as apart from the postulated nuclear reactions (see e.g. equations {1a} to {1e}) several other mechanisms might be present, such as nuclear transmutation. The next step was therefore to analyze the reaction products, i.e. to investigate any radiation or particles coming out from the Ni rod. The first such investigation was already conducted in 1999 and published as

Annex 3: ***Neutron Emission in Ni-H systems*, A. Battaglia et al, Il Nuovo Cimento, Vol. 112A, No. 9, p. 921-931 (1999),**

and obtained results hinting at the emission of neutrons and gamma rays, although some uncertainty remains as to the exact circumstances at which these emissions occur.

Therefore, in the experiments effected 2013-2015, a classical cloud chamber was employed additionally to detect energetic charged particles. One cell's operation was shut down and the Ni rod extracted. The rod was then placed in the Wilson-type cloud chamber, of which we show in the following two photographs taken in succession:

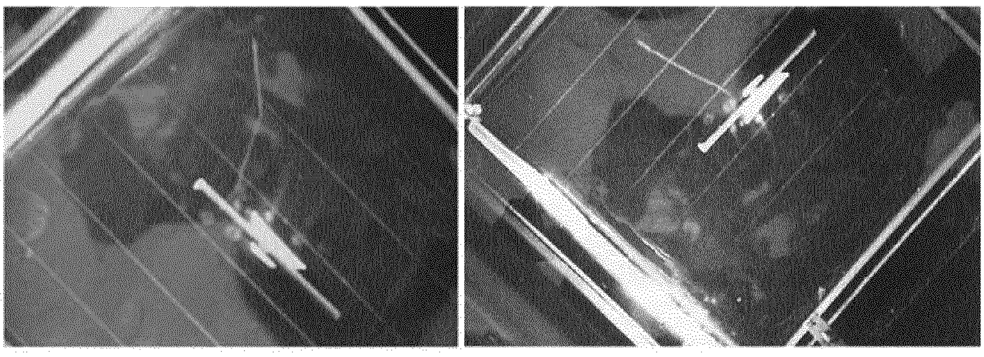


Photo of the Wilson cloud chamber: tracks of charged particles (left: protons, right: α-particles) emitted from a bar of 10 cm removed from the cell after shutdown. The number of emitted particles diminished quickly after extraction.

It is immediately evident that the rod emits protons. Therefore, independently of the *exact* mechanism of the primary reaction, of which – as mentioned – there may be several kinds apart from proton (^1H) capture reactions as described in the patent,