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We have seen interesting evidence of Low Energy Nuclear Reactions (LENR) experimenting with hydrogen and deuterium loading in thin palladium films deposited on inert supports or on other metals such as Nickel or Titanium.

Nuclear signature

Several types of experiments were performed at the ARGAL laboratory in Bareggio, in particular using thin films of palladium in an H_2 or D_2 atmosphere at various pressures. The laboratory is equipped with instrumentation suitable for the detection of neutron and gamma emissions with a He3 detector and a multi-channel detector with a 3-inch NaI crystal.

All the experiments carried out have been monitored with these instruments and in many cases it has been possible to detect neutron emissions attributable to nuclear events inside the reactor. Some of these anomalous events were short-lived, others were prolonged for several minutes. Apart from one particular case, the events were modest. In any case, this evidence shows yet again the nuclear nature of LENR phenomena, in the past highlighted by clear episodes of nuclear transmutations in similar conditions where it had been possible to analyze the material with the appropriate techniques at the end of the experiment.

High Hydrogen absorption by Nickel at ambient temperature

A sample of nickel on which a thin layer of palladium was deposited electrochemically, immersed in a hydrogen atmosphere at a pressure of about 950 mbar, showed an unexpected ability to absorb hydrogen at room temperature, specifically at around 25 degrees Celsius.

A first exposure of the sample to hydrogen showed a decrease in pressure in the reactor higher than the predictable and very modest one attributable solely to palladium deposited on the nickel surface. Normally this absorption is monitored by a thin film palladium resistance placed in the reactor just to verify the presence of hydrogen or deuterium in the reactor. In particular the macroscopic absorption reduced the system pressure from 950 to 870 mbar. This can only be attributed to nickel substrate, since the ratio of atoms <H> / <Pd> (few mg of deposited Pd) would have led to an absurd value of about 90. It should be noted that this initial absorption stabilized after about 3 days, showing a rather slow exponential progression. By subjecting the sample to vacuum degassing and subsequent loading cycles with hydrogen pressure, again at around 950 mbar, a marked increase in the speed of the phenomenon was observed (only 2 hours instead of 3 days), in addition to progressive increases in the volume absorbed. In the fourth cycle the pressure decrease was more than 300 mbar, such as to bring the ratio between hydrogen and nickel atoms to a value around 1.2, higher than the threshold considered for the activation of the LENR anomalies in the Palladium.

Excess Heat

The particular structure that showed this considerable absorption of hydrogen at room temperature did not show a similar behavior in a deuterium atmosphere, but it produced excess heat for about 20 minutes bringing the material from room temperature up to 130 degrees without any power input from the outside. The replication of the anomalies described is currently in progress.