Further progress/developments, on surface/bulk treated Constant wires, for anomalous heat generation by H_2/D_2 interaction

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In the framework of those studies aimed to analyze anomalous effects (thermal and/or nuclear) due to the interaction among some specific materials (pure and/or alloys) and H_2 (or D_2), we focused, since 2011, on a specific alloy called Constantan (Cu_{55}-Ni_{44}-Mn_1). We selected such material using our own considerations and intuitions and because, according to a scientific paper [1], it has the largest energy value for dissociation of H_2 to 2H, i.e. about 3eV. Among others B. Ahern suggested that Ni-Cu-H can be used for heat generation. We improved the preparation procedure of such wire from simple thermal treatments (up to May 2012 [2]) to more sophisticated ones, with more tight control of the multilayered (400-700) surface structures. Some of the results were presented at ICCF17, Aug. 2012 [3]. After [3], several groups asked to make their own experiments using such kind of wires (Φ=200μm, l=100cm) to cross-check (and possibly improve) our results. Some of such Researchers (group of M. Fleischmann Memorial Project; U. Mastromatteo) made public their (positive) results since Dec. 14, 2012 at Ministry of Aeronautics in Rome, Italy. In short, using an (home-made) apparatus integrated with an acquisition system (type PXi) by National Instruments, we made, since September 2012, not mentioning qualitative reconfirmation of previous results, further and unexpected progress and discoveries:

a) We developed a new kind of procedure of measurement (about anomalous excess heat) under dynamic vacuum, to avoid the effect of different thermal conductivity, inside the gas cell, due to type of gas and pressure variation: the wire didn't lose, macroscopically, H even at T=600°C.
b) We developed a new, very simple, type of surface coating (2 layers) that is nano-diamandoids like;
c) We observed, at least 2 times, the phenomenon of water splitting due to catalytic effect of surface treated Constantan. Such phenomenon is larger in comparison with what expected just by thermal splitting (wires temperature of about 300-500°C);
d) We observed a very large variation (about a factor 100) of Resistive Thermal Coefficient (RTC) of the wire used (400 layers) as the amount of H (related to the macroscopic value of resistive ratio R/Ro, normalize to empty wire Ro) increased. As example, with "treated" virgin wire (w/o H_2) the RTC was about $5*10^{-6}$ and increased to $6*10^{-4}$ when the R/Ro reduced to 0.68; temperature range 20-300°C. The RTC is larger with D in respect to H. Experiments are in progress also at 77K.
e) Overall results are affected by previous operating conditions

[1] S. Romanowski et al., "Density functional calculations...", LANGMUIR, 15(18), pp. 5773-5780, 1999.

[2] F. Celani et al., "Experimental results on sub-micro structured Cu-Ni alloys….", at X Inter. Workshop on Anomalies in Hydrogen-Metal Systems", Pontignano, Italy, April 10-14, 2012, in publishing (J. Chem. Mat. Res.; March 2013).

[3] F. Celani et al., "Cu-Ni-Mn alloy wires, with improved sub-micrometric surfaces, used as LENR device by new transparent, dissipation-type, calorimeter.", ICCF-17 Conference, Korea, 2012. Publishing by JCMNS, March 2013.