Excess Heat is Linked to Deuterium Loss in an Aqueous Nickel CF/LANR System

Mitchell Swartz[1], Charles Haldemann[2], Alan Weinberg[1,2], Brian Ahern
[1]JET Energy, Inc. [2] Lincoln Laboratory, MIT

We report some of the results from MIT's Lincoln Lab from 1993 to 1996, and supplementary recent data from JET Energy, Inc. These results indicate a loss of deuterium from ordinary water when excess heat is observed in an aqueous Ni system using a very large cathodic area. The MIT Lincoln Laboratory Electrolytic Cell system had a 3 liter capacity [cathode 4.7 pounds made from #46 hard drawn smooth nickel wire (0.041 mm diameter, area ~240,000 cm^2), anode platinized sheets of titanium (~3,200 cm^2), 0.6 M K_2CO_3 in laboratory distilled deionized "ordinary" water, and two internal ohmic controls (Figure 1)]. In addition to energy measurements, gas measurements and isotopic measurements were obtained. The early MIT experiments had input electrical powers ~25 watts. The maximum power gains were 5 to 14 times electrical input when the thermoneutral correction was used. When using V*I as electrical input power, the maximum incremental power gain was ~4 times electrical input; this occurred at lower electrical input power. The maximum excess power was ca. 5 watts. The exit gas from the enclosed electrolytic cell, using ~100% collection by liquid nitrogen condensation in the recombiner, generated ranged from 2 to 100 cc/minute [2.8 to 144 liters/day]. Isotopic analysis was made by mass spectrometer (INFICON Quadrapole-102 Volt Energy)[2]. The HD/H_2 isotopic ratio [3/2 ratio] was less for gas leaving the cell, with some recovery in the recombiner water. Figure 2 shows the HD/H_2 isotopic ratios at different locations at the end of a long run. This result heralds deuterons as the fuel. It is consistent with Swartz *et alia* [ICCF9, 3] and probably with the reports of helium production in Pd systems [4]. Importantly, deuterons and their isotopic flow [5], including in ordinary water systems, must be considered as the fuel for active aqueous nickel CF/LANR systems.

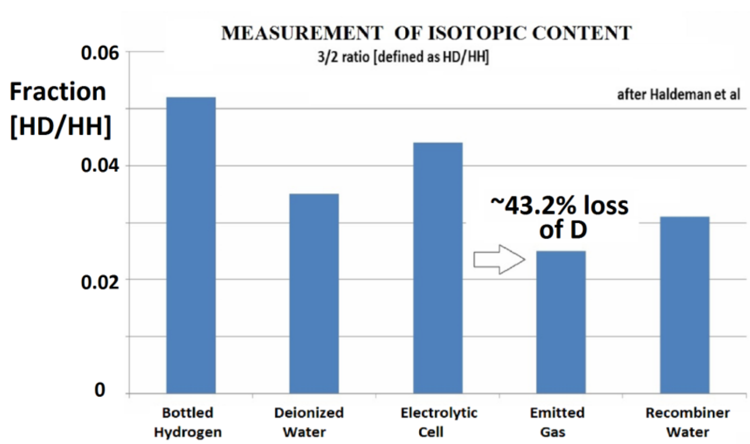

Figure 1 (left) **-**The electrolytic MOAC ["Mother of all Cathodes"] cell, unfilled; before refilling and adding supplemental diagnostics. **Figure 2** (right) **-** 3/2 [HD/H_2] Ratios at various system locations.

[1] Swartz M. R., *Excess Power Gain using High Impedance and Codepositional LANR Devices Monitored by Calorimetry, Heat Flow, and Paired Stirling Engines, Proc. ICCF14* 1, (2008), 123; ISBN: 978-0-578-06694-3, 123, (2010); www.iscmns.org/iccf14/ProcICCF14a.pdf
[2] Haldeman, C.W. E.D.Savoye, G.W.Iseler, H.H.Clark, "*Excess Energy Cell Final Report*" (1996).
[3] Swartz. M., G. M. Verner, A. H. Frank, "*The Impact of Heavy Water (D_2O) on Nickel-Light Water Cold Fusion Systems*", Proc. ICCF9, China, Xing Z. Li, pages 335-342. May (2002).
[4] Miles, M. et alia, *"Correlation of excess power and helium production during D_2O and H_2O electrolysis using palladium cathodes", J. Electroanal. Chem.*,1993, 346, 99-117.
[5] Swartz, M., "*Quasi-One-Dimensional Model of Electrochemical Loading of Isotopic Fuel into a Metal*", *Fusion Technology*, 22, 2, 296-300 (1992).