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^{4}He observations in *Cold Fusion* experiments

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Article Info

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Abstract

Observations of ^{4}He released in *Pd/D$_2$O* electrochemical experiments are examined in light of a new perspective on such experiments. The observations had previously been thought to have been conclusive of nuclear reactions but I show that they had been incorrectly identified and were of a quite different origin.

Keywords:

Background

The present paper was written in response to certain questions that arose after my recent Letter [1] was published. A well-known researcher in *cold fusion* contacted me stating that "he agreed there were no neutrons observed (presumably from the most likely reaction d+d → ^{3}He+n") but both he and a second well-known researcher [2,3] had observed ^{4}He in the exiting gases evolved in their *Pd/D$_2$O* electrochemical experiments *(cold fusion)*. Both experiments were well-documented and had consistent results. Together they appeared to provide experimental evidence that *some form of fusion* was taking place in their electrochemical cells. But, this is a questionable interpretation as I show below.

The *Putative* Nuclear Reaction

Both researchers pointed to the reaction d + d → γ+ ^{4}He as being responsible for the ^{4}He production. Still, the problem is that although this is a well-established nuclear reaction it produces γ rays that carry 23.8 MeV, and at this energy they would be easily detected, as well as being a radiation health risk. This inconsistency was recognized by both [2,3] commenting on the reaction as: d + d → ^{4}He + 23.82 MeV (lattice), that is to say by delivering the assumed reaction energy from the γ's into lattice kinetic energy without saying how this could occur.

The New Perspective in Electrochemical Experiments

For certain obvious reasons, I have chosen to continue with the *Different Perspective* that I presented in [1].

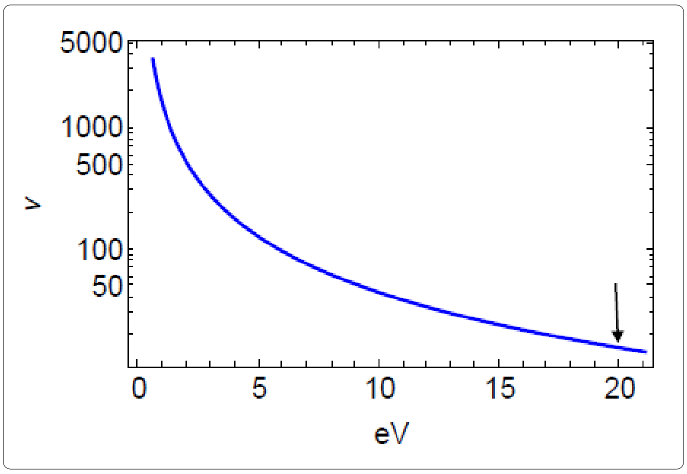

Figure 1. The log-linear plot of the energy transfer rate (ν) for electron-deuteron (blue) collisional build-up taking $f = 10^{-10}$ and other parameters as given in [1]. The ϵ = 20 eV point (the vertical arrow) is the least energy value required to *generate tandem electrons* that therefore provide for *tresino* generation. Note that ν = 16/s at the ϵ = 20 point so the *tresino energy* released is about 59200 eV/s. This result means that there is a substantial build-up of d* *deuteron-tresinos* in the cell lattice along with substantial numbers of deuterons.

The Alternative of ^{4}He Production

It was clear from our Early Universe cosmology paper [4] that roughly equal numbers of *protons and tresinos* would be created. They would then combine into what we at then-called *proton-tresino molecules* or PTMs. Later, I re-examined this configuration as *dark rotors* [6] because they would be attracted to each other, collide, and then "spin-down" to a minimum size. Moreover, they would be charge-neutral and in the mostly hydrogen Early Universe would appear as *p-p** (the * indicates a *proton-tresino*). In fact, later on the *dark rotors* came to represent our *dark matter* particles that pervade most of the late Universe. Note that in Figure 2 below, the dynamics is a straightforward extension of the physics of [6].

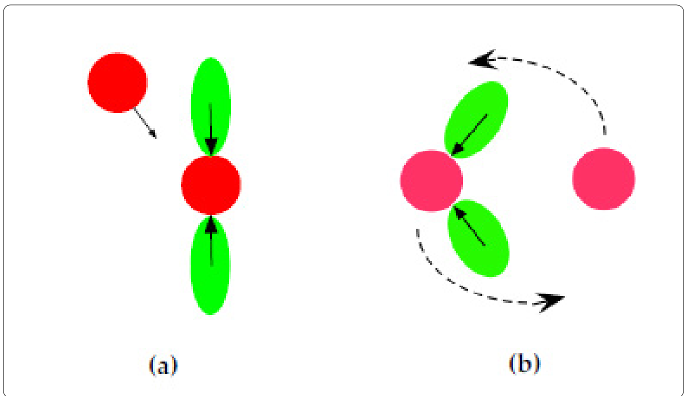

Figure 2. Because of electrostatic attraction, the left-hand panel (a) shows a *d** with the deuteron in (red) and its two electrons in (green) being "impacted" by another deuteron. The right-hand panel (b) shows the resulting *d*−d* rotor with the same color scheme. One might expect that with protons in the cell, one proton might be substituted for the second deuteron in (a) so that a *d* − p* rotor would be formed and registered as ^{3}He in a mass-spectrometer, as well.

Notice that this *d* − d* rotor "spins-down" to a very small size ≈ 14 Comptons, is charge-neutral having atomic mass of 4. This rotor will be detected in mass-spectrometers as indistinguishable from a ^{4}He. So, as already mentioned, the observations of ^{4}He were not the result of *nuclear reactions* rather they resulted from the generation of *d* − d* rotors (or *d* − p* rotors) in the Pd lattices by *deuteron tresinos*.

Conclusions

The *New Perspective* presented in [1] has made it clear that the observed ^{4}He was not the result of *nuclear reactions* but was the result of *tresinos* generating *dark rotors* that appeared to be ^{4}He (or ^{3}He) in mass-spectrometer observations. *Cold Fusion* has been an incorrect physics picture for many years, this clear analysis bears that out.

References

1. Mayer FJ. The Electron's hidden role in Cold Fusion/LENR. *Int J Phys Stud Res*. 2024 ;6(2): 119-121. doi:10.18689/ijpsr-1000120
2. Miles M, Hollins RA, Bush BF, Lagowski JJ, Miles RE. Correlation of excess power and helium production during D_2O and H_2O electrolysis using palladium cathodes. *J Electroanal Chem*. 1993; 346: 99-117. doi: 10.1016/0022-0728(93)85006-3
3. McKubre MCH. Tanzella F, Tripodi P, Hagelstein P. The Emergence of a Coherent Explanation for Anomalies Observed in D/Pd and H/Pd Systems; Evidence for 4He and 3He Production. 8th International Conference on Cold Fusion. 2000.
4. Mayer FJ, Reitz JR. Compton Composites Late in the Early Universe. *Galaxies*. 2014; 2(3), 382-409. doi 10.3390/galaxies2030382
5. Mayer FJ. Revisiting Compton Composites Late in the Early Universe. *Int J Cosmol Astron Astrophys*. 2024; 6(1): 272- 273. doi: 10.18689/ijcaa-1000148
6. Mayer FJ. Dark rotors in the late universe. *Heliyon*. 2015. 1(3): e00039. doi: 10.1016/j.heliyon.2015.e00039