Mallove, E., *Alchemy Nightmare: Skeptic Finds Heavy Element Transmutation Cold Fusion Experiment!* Infinite Energy, 1995. **1**(2): p. 30.

Alchemy Nightmare: Skeptic Finds Heavy Element Transmutation Cold Fusion Experiment! Hidden 3-years . . .

At ICCF5 in April, EPRI (Electric Power Research Institute) cold fusion program director Dr. Tom Passell gave an overview of the cold fusion field. [1] The biggest news from his talk, however, was the first *public* revelation of the results of the EPRI-funded work of physicist Dr. Kevin Wolf at Texas A&M University. This research occurred back in 1992, but others—including Dr. Wolf—have since tried to keep these results from surfacing. Why?

Because the work shows unambiguous evidence of the transmutation of heavy elements by some heretofore unknown nuclear process in a Pons-Fleischmann-type cold fusion experiment. Why would Wolf want to sit on a possible major insight into the working of "cold fusion"?

You see, Dr. Wolf was initially an extraordinary pioneer in the cold fusion field. He made early announcements in the spring of 1989 that he had detected neutrons and tritium in cold fusion experiments at Texas A&M. It seems that Wolf later lost his nerve during the spate of scurrilous attacks by journalist Gary Taubes in 1990, who alleged that tritium could be explained by fraudulent spiking of cold fusion cells in the laboratory of Professor John O'M. Bockris, also at Texas A&M. (These charges were immediately shown to be false and without any scientific merit, but they have been repeated by Taubes and others, who continued to pollute scientific discussions of the field.)

Dr. Wolf concluded in 1990 that his tritium results were flawed and were most likely the result of pre-existing contamination of his palladium. He "withdrew" these results in the general press, but did not issue a formal retraction to any journal, as far as is known. Thereafter, he became a quiet skeptic of the cold fusion field, even though he continued to be funded by one of Dr. Passell's colleagues at EPRI, a skeptic who was bent on tearing down cold fusion. Wolf continued his electrochemical cold fusion experiments, reportedly continuing to find low-level neutrons, but nothing else of interest.

In 1992, Dr. Wolf made an amazing serendipitous discovery while chasing down low-level neutrons. Three of his palladium cathodes that had undergone Pons-Fleischmann electrolysis in heavy water were found by Geiger counter examination to be palpably radioactive! Subsequently, the cathodes were examined in sophisticated gamma-ray spectrometers at various laboratories, which could observe the intensity and precise frequencies of the gamma ray lines. Those experts, including Wolf, who saw the multiple spectral lines of gamma emission had no doubt that these were the signatures of radioactive isotopes with masses near that of palladium.

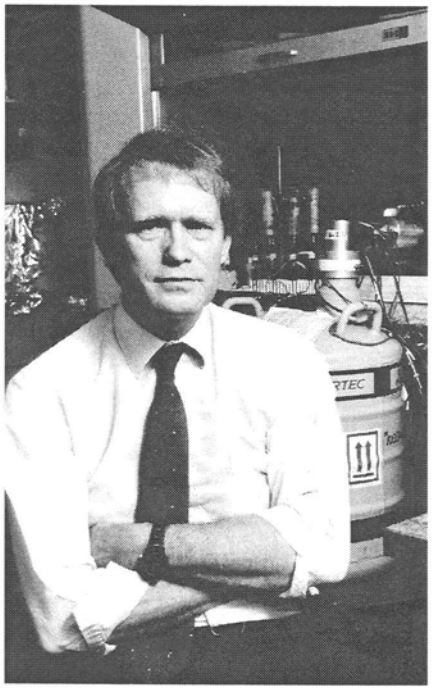
Unfortunately, Dr. Wolf could not imagine that these astonishing results—*in which he believed fully,* but could not thereafter reproduce—had anything to do with "cold fusion"! That's right, he is said to believe to this day that these radioactive isotopes were *not* due to anything fundamentally connected with "cold fusion." He thinks the results may me due to the effects of cosmic ray impacts in the earth's atmosphere—*which just happened to be detected in his "cold fusion" experiment.* He is said to believe that hypothetical Weakly Interacting Massive Particles (WIMPS) may have caused these transmutations. Pun intended: we respectfully suggest that Dr. Wolf has wimped out on his own, solid data.

The world was prevented from hearing about this work last year. Dr. Wolf had been scheduled to talk at ICCF4 on Maui, Hawaii in December 1994 on a "To Be Announced" topic. He was "encouraged not to attend," by his cold fusion skeptic funding agent.

The Passell Presentation

Just what did Tom Passell's ICCF5 presentation show? It indicated that in 1992, about six weeks after a Pons-Fleischmann-type cold fusion experiment was completed in Dr. Wolf's lab, at least one cathode was found to be inexplicably radioactive.

Gamma rays from at least seven radionuclides were unmistakably observed. The number of counts observed per peak is on the order of 10^4-10^6 counts, with a signal-to-noise ratio of ten. Under these conditions, the statistical significance of the data is extremely high. Since there is no known explanation for how palladium can be made radioactive, it is can be assumed that the "cold fusion" reaction, whatever that is, was involved in some way.



Physicist Dr. Kevin Wolf of Texas A&M University. *Photo: Courtesy Texas A&M Information Service*

Isotope	Abundance
Silver 110M	0.8B
Rhodium 99	2.7B
Ruthenium 103	3.7B
Silver 106m	4.5B
Rhodium 102m	6.3B
Palladium 100	7.7B
Rhodium 102	12B
Rhodium 101	12B
Rhodium 101m	22B
Silver 106	26B

Table 1. Elements Found in Wolf/Passell Data Isotope Abundance

Table 1 shows the radionuclides which were detected, and their original concentration is back-calculated to the time when they were assumed to have been created (since radioactive nuclei are transmuted into some other nucleus when they decay, the inventory of radioactive material is constantly changing).

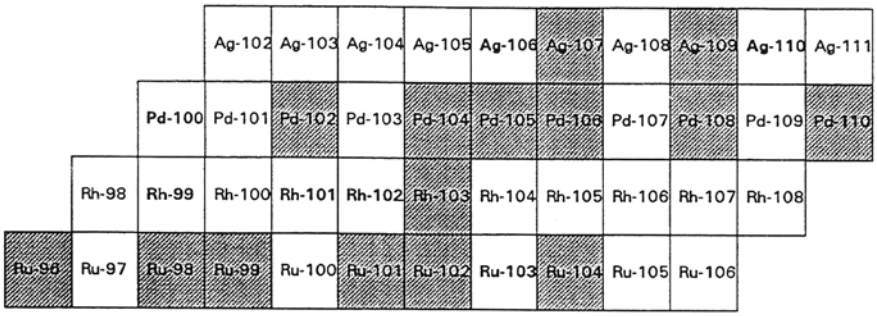


Figure 1. Nuclide chart for relevant isotopes. Bold numbers are Passell data. Shaded boxes are stable isotopes.

Figure 1 shows graphically where these radionuclides appear in relation to the stable nuclei. In this chart, different numbers of protons are laid out vertically (protons determining the identity of each element) and the number of neutrons are laid out horizontally. Isotopes of the same element may have different numbers of neutrons. Stable nuclei are shaded; the specific radionuclides reported by Passell are outlined in bold. Note that there are six stable isotopes of palladium. These are Pd-102, Pd-104, Pd-105, Pd-106, Pd-108 and Pd-110. All of these nuclei are stable and occur in natural palladium.

MIT's Peter Hagelstein has argued that the atomic lattice may couple with individual atoms, producing metastable (highly excited) states in individual nuclei. Under some conditions neutrons can even "hop" from one atom to another.

This could possibly yield some clues for some of the radionuclides. For example, it would not be too far-fetched to imagine that some excited state Pd-110 might emit a beta particle (changing a neutron to a proton) resulting in Ag-110. One might imagine that Ag-106 might be created via a similar mechanism. To produce Ru-103, Pd-108 might lose a neutron via a neutron hop and then alpha decay. These reactions are, hypothetically at least, worth considering.

But how would rhodium-99 be obtained? One way, as Passell pointed out, would be to assume that a proton is absorbed by Pd-102, quickly followed by alpha emission. This would temporarily create Ag-103, and then Rh-99 upon ejection of the alpha particle, since an alpha particle consists of two neutrons and two protons. Still, many scientists find it difficult to accept that a proton could get close enough to interact with a larger nucleus, since both are positively charged and thus strongly repel each other via Coulomb repulsion. Other possibilities are that the Rh-99 resulted from Ru-99 (present as a minute impurity in palladium-approximately 5 ppm in Johnson-Matthey's highest grade of palladium, for example). Obviously, in this case it must be asked why only impurities with atomic numbers close to palladium participated in the transmutation event. Specifically, why would Ru-99, in particular, participate so strongly in the transmutation reactions, given its small abundance.

Another possibility is that *three* neutrons might leave from Pd 102, forming Pd-99, which could then positron decay (that is, emitting an antimatter electron) to Rh-99. Low neutron isotopes such as Pd-99 tend to be positronic emitters, incidentally. If indeed many neutrons are able to somehow downshift from neutron rich isotopes to neutron-poor isotopes, then it might be suspected that other stable nuclei are being produced. If that is so, perhaps a mass spectroscopic study would reveal abnormal isotope ratios within the palladium series. However, this has not been attempted.

The bottom line is that no one knows what could possibly result in the bizarre data presented by Passell. Additional experiments could perhaps clear the picture, but in the present environment of minimal funding for cold fusion nuclear effects work in the U.S., that seems unlikely.

In any case, the tendency to zero in on fusion reactions as the probable source of the cold fission effect must be revisited. Certainly the fusion of light isotopes such as deuterium and hydrogen does nothing to explain the transmutation of heavy metal isotopes

On the other hand, it may well be asked what evidence there is that light element fusion contributes at all to the observed cold fusion data set Helium production may result from D-D fission, as has been pointed out countless times. However, helium is also created from alpha decay of heavy elements. We might ask ourselves, therefore, whether there exists any evidence in favor of unexpected fission versus unexpected alpha decay.

Tritium, also claimed by many experimenters, is also a possible fusion product from D-D fusion. However, if neutron transport occurs in other ways (such as Hagelstein's proposed neutron "hopping" mechanism), we might wonder if it is possible to create tritium by neutron hopping from a heavy atom such as palladium to deuterium. The nuclear reactions observed by cold fusion experimenters may not be fusion at all. Maybe it is something even more profound that is raising havoc with nuclear stability-such as, perhaps, the tapping of the vacuum energies of space itself, ZPE?

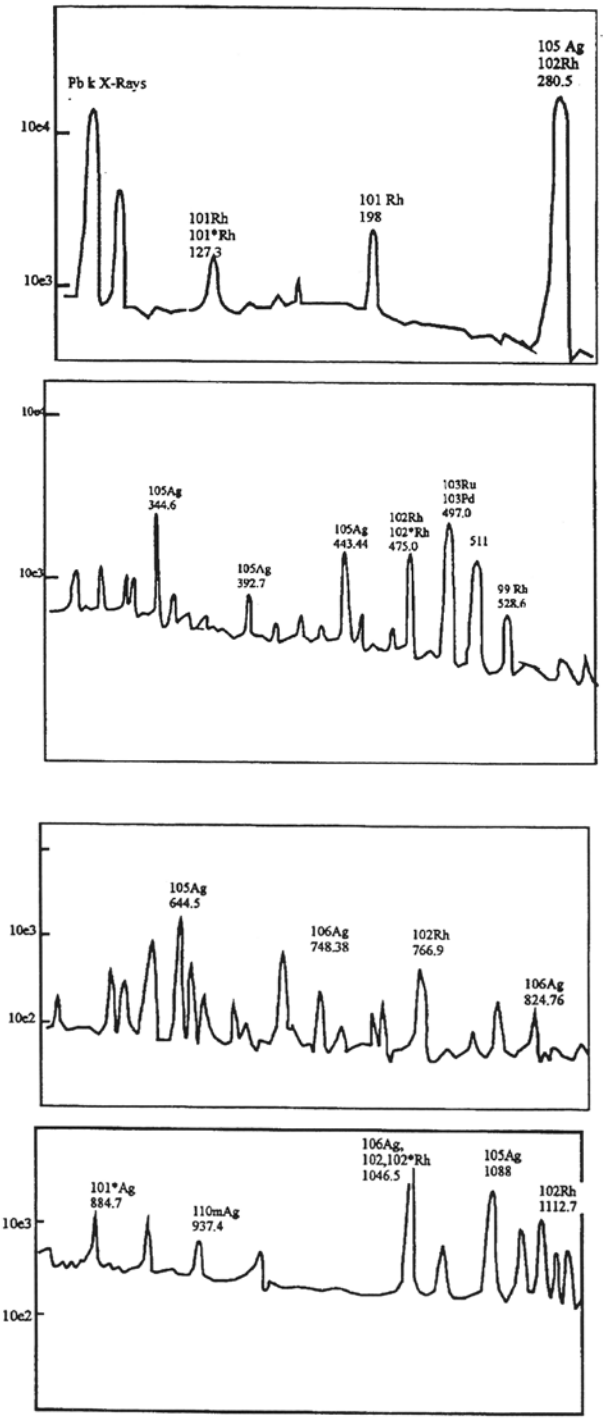


Fig. 2. Reproduction of gamma spectra from the video tape of Dr. Passell's presentation at ICCF5. *(Permission to tape and distribute information, granted by Dr. Passell)*

(These graphs are reproduced in greater detail in Reference 1, below)

References

1. Passell, T.O., *Radiation data reported by Wolf at Texas A&M as transmitted by T. Passell*. 1995, EPRI http://lenr-canr.org/acrobat/PassellTOradiationd.pdf