LETTERS TO THE EDITOR

COMMENTS ON "NUCLEAR ENERGY RELEASE IN METALS"

In Ref. 1, Mayer and Reitz included some palladium isotope ratio measurements that were made at BP Research as part of a collaborative effort with Texas A&M University. They used these data to support their theory that a $^{106}Pd(t,d)^{107}Pd$ reaction occurred. Unfortunately, Mayer and Reitz misinterpreted the palladium isotope ratio measurements in Ref. 1. In fact, the data do not support this reaction taking place. We feel this mistake must be cleared up to prevent further confusion in the field of cold fusion.

In Fig. 1 of Ref. 1, Mayer and Reitz use secondary ion mass spectrometry palladium isotope depth profile ratios from our work. The depth profile ratios included $^{104}Pd/^{102}Pd$, $^{105}Pd/^{102}Pd$, $^{106}Pd/^{102}Pd$, and $^{108}Pd/^{102}Pd$ from cathodes that were electrolyzed in both H_2O and D_2O. This plot indicated that the mass 106/mass 108 ratio was 1.15 in the cathode electrolyzed in H_2O, while it was 1.01 in the cathode electrolyzed in D_2O. Mayer and Reitz concluded that the 106/108 isotope ratio measured in the cathode electrolyzed in H_2O was correct, while the cathode electrolyzed in D_2O was depleted in ^{106}Pd. However, they did not consider the contributions from hydride and deuteride interferences. The authors did not have sufficient information from this single plot to determine the contribution from hydride and deuteride interferences. However, it is unfortunate that they did not consult us on interpretation prior to publication. We have performed a large number of measurements on these and other cathodes and have carefully quantified the hydride and deuteride interferences as well as the mass discrimination of the mass spectrometer (heavier isotopes are detected less efficiently than lighter isotopes).

In the case of the cathode electrolyzed in H_2O, ^{106}Pd had an interference from ^{105}PdH, while ^{108}Pd was interference free. Comparison of the measured intensities of ^{102}Pd and ^{102}PdH would give the relative hydride contribution. The cathode electrolyzed in D_2O was more complicated because it contained both PdD interferences and small PdH interferences. The relative hydride interference could again be determined from masses 102 and 103. However, the deuteride contribution cannot be determined cleanly from any single mass; it must be calculated using a set of simultaneous equations. We have done this and found that the PdH peak from the H_2O-electrolyzed cathode was 12.7% of the intensity of the corresponding palladium peak. For example, if ^{105}Pd had an intensity of 10^5 count/s, ^{105}PdH would contribute 1.27×10^4 count/s to mass 106. The PdD intensity was calculated to be 6.5% of the corresponding palladium peak in the cathode electrolyzed in D_2O. We found that the D_2O cathode also had a small (0.8% of palladium) interference from PdH.

We also verified that no other impurities interfered with the palladium peaks. Two of the common interferences with palladium are ZrO and Cr_2. These impurities were not detected at significant levels in these cathodes, however.

Once the interferences were stripped from each of the palladium isotope peaks and the mass discrimination of the mass spectrometer (−1.17%/amu) was removed, the measured isotope ratios from *both* cathodes were within 1% of the natural abundance values. Therefore, there is no evidence for a change in the palladium isotope ratios between the cathodes electrolyzed in H_2O or D_2O, as was claimed in Ref. 1.

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August 2, 1991

REFERENCE

1. F. J. MAYER and J. R. REITZ, "Nuclear Energy Release in Metals," *Fusion Technol.*, **19**, 552 (1991).

RESPONSE TO "COMMENTS ON 'NUCLEAR ENERGY RELEASE IN METALS'"

We agree with Bryan, Gibson, and Murphy[1] that their corrected data do not support our assertion[2] that the $^{106}Pd(t,d)^{107*}Pd$ reaction was taking place in the Appleby, Murphy, and Srinivasan experiment. It is unfortunate that we used their preliminary data and did not consider the possibility of hydride and deuteride interferences.