Although there may be no experimental evidence that the $^{106}Pd(t,d)^{107*}Pd$ reaction is taking place, this does not change the basic thesis of our paper—that "cold fusion" observations result from resonant direct nuclear reactions (RDNRs) mediated by short-lived resonance particles (which we call hydrons). A hydron is a compact, charge-neutral, short-lived resonance particle consisting of an electron and the nucleus of a hydrogen isotope. We wish to point out that since the publication of our paper,[2] we have been studying the dynamics of hydron populations and have concluded that in hydron annihilation, following a nuclear reaction, the electron can carry away a substantial amount of the reaction Q. This has broadened the base of possible RDNRs for "cold fusion" considerably compared with those we previously listed.[2]

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REFERENCES

1. S. R. BRYAN, J. H. GIBSON, and O. J. MURPHY, "Comments on 'Nuclear Energy Release in Metals,'" *Fusion Technol.*, **21**, 95 (1992).

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

REPLY TO "COMMENTS ON 'EXCESS HEAT PRODUCTION BY THE ELECTROLYSIS OF AN AQUEOUS POTASSIUM CARBONATE ELECTROLYTE AND THE IMPLICATIONS FOR COLD FUSION'"

In response to the comments of Mayer in Ref. 1, I have measured the current of my cell by shorting the cathode and anode directly through an ampmeter and have measured 0 A. The operating cell voltage is 2 to 3 V, and the cathode-anode separation is 1 cm. A 1.3-MeV beta particle would travel 0.4 cm in water, which would change the energy of an emitted beta particle by a maximum of ~1 eV. Given that the ^{40}K β-endpoint energy emitted in all directions is 1.3 MeV, which corresponds to $P_\beta = 3.6 \times 10^{-30} N_{40}$ W (N_{40} is the number of ^{40}K atoms in the cell), I conclude that this decay energy is irrelevant to the *V-I* characteristics of a potassium carbonate electrolysis cell. Furthermore, ^{40}K's natural abundance is 0.01%, and this isotope has a billion-year half-life; thus, decay is inconsequential to the conductivity of the cell. In fact, increasing the concentration of potassium carbonate from 0.57 *M* to 1 *M* does not appreciatively decrease the measured resistance of the cell. This increase in concentration represents an increase of charge carriers of $>10^{20}$ times that of the beta particles emitted per second that actually form an ion radical in 10^{-15} s. Ion radicals with a half-life of 10^{-10} s react to yield free radicals. The free radicals have a half-life of 10^{-5} s and, of course, are uncharged; therefore, they do not affect the conductivity of an electrolytic cell. The steady-state concentration of charged species from beta decay is essentially zero.

I acknowledge that quantum mechanics is strongly entrenched, but even the founding scientists were not convinced of its validity. Quantum mechanics was only begrudgingly accepted over a period of decades, and after decades of development, quantum mechanical theory is plagued with inconsistencies. My theory of the one-electron atom is derived from first principles, predicts four quantum numbers (including spin), and is consistent with experimentation. Quantum mechanics is based on postulates and fails to predict spin. I do not accept incumbency as a validation of scientific argument. Each prediction should be tested against experimentation without prejudice of quantum mechanical preconceptions.

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REFERENCE

1. F. MAYER, "Comments on 'Excess Heat Production by the Electrolysis of an Aqueous Potassium Carbonate Electrolyte and the Implications for Cold Fusion,'" *Fusion Technol.*, **20**, 511 (1991).