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Nuclear Transmutations in Polyethylene (XLPE) Films and Water Tree Generation in Them (2)

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Abstract

The cold fusion phenomenon (CFP) includes various events predicting nuclear reactions in such various materials (CF materials) as PdD_x , NiH_x and XLPE containing a lot of hydrogen isotopes H or/and D. The CF materials include such astonishing materials as biological systems and the polyethylenes, which is the material we investigate in this paper. As we have investigated before[1,2], Kumazawa et al. detected various new elements in the XLPE (crosslinked polyethylene) films dipped in aqueous electrolytic solutions with and without application of high-frequency electric field. The experimental data had been explained by us using the TNCF model consistently with other data of nuclear transmutations observed in CF materials with transition metals. In the investigation of the cause of gamma rays observed in XLPE experiments, Kumazawa et al.[3] determined the origins of the gamma rays as nuclei ^{214}Pb and ^{214}Bi. Using the TNCF model, we could explain the new data obtained by Kumazawa et al.[3] in accordance with our explanation[1,2] of former data obtained by them.

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Biotransmutation as a Cold Fusion Phenomenon

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Abstract

The nuclear transmutations in biological systems (biotransmutations) have been investigated for more than two centuries as reviewed in several books[1,2]. Recently, the investigation of the biotransmutations made a great progress in the direction to determine the microscopic origin of the nuclear reactions in the biological system where is apparently no mechanism to accelerate charged particles up to enough energies to cause fusion reactions of nucleons. Vysotskii et al.[3] have shown not only the biotransmutation but also the decay-time shortening of radioactive nuclides in systems including microbial cultures: There are data sets showing (1) production of $^{57}_{26}Fe$ from $^{55}_{25}Mn$ and also (2) acceleration of the decays of radioactive nuclei $^{137}_{55}Cs$, $^{140}_{56}Ba$ and $^{140}_{57}La$ in several bacterial cultures. To solve the riddle of nuclear reactions occurring in biological systems, there had been proposed the TNCF model which was applied successfully to various events in the cold fusion phenomenon (CFP) including the Carbon-Hydrogen systems[4]. In this paper, we have reexamined the data of biotransmutation and decay-time shortening of radioactive nuclides in microbial cultures from molecular levels to investigate nuclear reactions between participating nuclei in the system. It is shown that the TNCF model is applicable also to this phenomenon.

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The Cold Fusion Phenomenon and Neutrons in Solids

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Abstract

The cold fusion phenomenon (CFP) has been investigated for more than a quarter of a century after its discovery by Fleischmann et al. in 1989. Looking into the various products of the CFP, it is clear that there are nuclear reactions in the CF materials (PdD_x, NiH_x, CH_x, etc.) with no acceleration mechanisms. We have tried to get overall perspective of the CFP using a phenomenological model (TNCF model) based on several premises referring to the experimental facts[1)]. The TNCF model has been successful to give qualitative and sometimes quantitative explanations to the numerical relations between data of observables with appropriate values of the single adjustable parameter n_n, the density of quasi-stable neutrons assumed in CF materials. Then, the origin of the trapped neutrons in CF materials has been contemplated to give a quantum mechanical foundation to the model[2)]. In the process of this contemplation, the ideas of the neutron band in the CF materials have been developed[1)] by the quasi-free neutron model and by the tight-binding neutron model. The concept of the former model is used in the ultra-cold neutron physics[3)] even if the neutrons in the band decay with the life-time of 889 ±3 s. It is shown in this paper that the neutrons in the latter model are free from the beta decay and are the candidate for the trapped neutrons in the TNCF model.

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From the History of CF Research – A Review of the Typical Papers in the Cold Fusion Phenomenon –

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Abstract

The investigation of the cold fusion phenomenon (CFP) has lasted more than a quarter of a century after 1989 when it was discovered without remarkable success in innovation of the paradigm of modern science. Recent trend of the CF research seems shifting to the application of the CFP leaving the fundamental problem how to explain this curious phenomenon consistently in the frame of modern physics. We have tried to investigate the CFP in accordance with the common sense of modern science established mainly in 20^{th} century. To do so, we emphasized importance of communication with other scientists working in the established fields of science. The communication has been given several times in the history, especially in the case of the investigations of the CFP by committees in the DOE as discussed in our papers[1]. Another point we would like to emphasize and to give a review in this paper is a big regard for the past experimental results piled up in these more than 25 years. The first measurement of the energy spectrum of neutrons was performed by S.E. Jones et al. (1989). On the detection of ^4_2He**,** we have to consider the work by Morrey et al. (1990). The first data of nuclear transmutation in a protium system was obtained by R.T. Bush and R.D. Eagleton (1993, 1994). The most extensive measurement of excess energy was performed by M.C.N. McKubre et al. (1993, 1994). M. Okamoto et al. (1994) determined the localized nuclear reactions in the CFP for the first time. There are several astonishing data sets on the nuclear transmutations (NTs) in such systems very different from the main CF materials (transition-metal hydrides and deuterides) as carbon-hydrogen systems including hydrogen graphite, XLPE and microbial cultures. To give a unified explanation of them, we have to investigate them correctly and contemplate sincerely.

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