CFRL English News No. 100 (2016. 9. 15)

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CFP (Cold Fusion Phenomenon) stands for

"Nuclear reactions and accompanying events occurring in open (with external particle and energy supply), non-equilibrium system composed of solids with high densities of hydrogen isotopes (H and/or D) in ambient radiation" belonging to Solid-State Nuclear Physics (SSNP) or Condensed Matter Nuclear Science (CMNS).

This is the *CFRL News* (in English) No.100 for Cold Fusion researchers published by Dr. H. Kozima, now at the Cold Fusion Research Laboratory, Shizuoka, Japan.
This issue contains the following items:

1. ***Proceedings of JCF16* was published**
2. **Four papers from CFRL are published in *Proc. JCF16***
3. **ICCF20 will be held on October 2 – 7, 2006 in Sendai, Japan**

1. Proceedings of JCF16 was published on September 10, 2016

***Proceedings of JCF16* edited by K. Tsuchiya was published and posted at the JCF website; http://www.jcfrs.org/proc_jcf. html**

2. Four papers from CFRL are published in *Proc. JCF16*

Four papers presented from CFRL were published in the *Proceedings of JCF16* and posted at the JCF website; http://www.jcfrs.org/proc_jcf. html

Extended versions of these papers as *Reports of CFRL* **16-1 – 16-4** are posted at CFRL website:
http://www.geocities.jp/hjrfq930/Papers/paperr/paperr.html

We cite here Abstracts of these papers in the convenience of readers.

(1) **H. Kozima, "From the History of CF Research – A Review of the Typical Papers on the Cold Fusion Phenomenon –,"** *Proc. of JCF16* 16-13, 116 – 157 (2016), ISSN 2187-2260.

Abstract

The investigation of the cold fusion phenomenon (CFP) has lasted more than a quarter of a century after 1989 when a part of its vast and diverse contents was discovered by Fleischmann et al. 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 problems how to explain this curious phenomenon consistently with other phenomena 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 the 20th century. To do so, we emphasized importance of communication with other scientists working in the established fields of science.

Another point we would like to emphasize is necessity to give a great regard for the typical experimental results in this field piled up in these more than 25 years. The first measurement of the energy spectrum of neutrons in a CF system (a system where occurs the CFP) was performed by S.E. Jones et al. On the detection of ${}^{4}_{2}He$, we have to consider the work by Morrey et al. in 1990. The first data of nuclear transmutation in a protium system was obtained by R.T. Bush and R.D. Eagleton in 1993. The most extensive measurement of excess energy was performed by M.C.N. McKubre et al. in 1993 and 1994. M. Okamoto et al. confirmed the localization of nuclear reactions in the CFP for the first time in 1994. There are several astonishing data sets on the nuclear transmutations (NTs) in very diverse systems from transition-metal hydrides and deuterides such as NiH_x and PdD_x ($x \approx 1$) to carbon-hydrogen systems including hydrogen graphite, XLPE and microbial cultures.

To give a unified explanation of the vast and diverse experimental data, we have to follow the orthodox approach to the unknown phenomenon, the

phenomenological approach, often used in the history of science. A phenomenological approach using a model based on the experimental facts, the TNCF model, has shown its usefulness to give a unified explanation of the CFP. In the course of the review of typical data sets in this paper, we use the model as a point of view necessary to grasp the total image of the CFP. Through the review of typical papers on the CFP depicted in this paper, we have given an overview of the science of the nuclear reactions occurring in CF materials (materials where occurs the CFP) demonstrated by vast and dispersed events observed in these 25 years. In short, the science of the CFP is the science of neutrons in CF materials.

(2) **H. Kozima and K. Kaki, "The Cold Fusion Phenomenon and Neutrons in Solids,"** *Proc. of JCF16* 16-14, 158 – 198 (2016), ISSN 2187-2260.

Abstract

A phenomenological approach, the trapped neutron catalyzed fusion model (TNCF model) where existence of thermal neutrons in CF materials is assumed, to the science of the cold fusion phenomenon (CFP) is reviewed with attention to the behavior of neutrons in solids, especially in CF materials composed of the superlattice of a host sublattice and a hydrogen sublattice. The success of the TNCF model to give a unified explanation of widely dispersed experimental data obtained in the CFP suggests reality of the fundamental premise of the model, existence of the trapped neutrons in CF materials. Taking this clue as a hint showing a possible existence of neutrons in such specific solids as CF materials, in which there is a superlattice composed of host and hydrogen isotope sublattices, we have tried to find out a new state of neutrons in them not noticed in solid state physics and in nuclear physics by now. A possible quantum mechanical formation of neutron energy bands in CF materials is investigated using techniques developed in the electron energy bands in solids.

(3) **H. Kozima, "Nuclear Transmutations in Polyethylene (XLPE) Films and Water Tree Generation in Them (2)"** *Proc. of JCF16* 16-17, 210 – 215 (2016), ISSN 2187-2260.

Abstract

An explanation of the nuclear transmutation (NT) observed in the XLPE (crosslinked polyethylene) films dipped in aqueous electrolytic solutions with and without application of high-frequency electric field has been given by the neutron-drop model, an extended version of the TNCF model, used in the theoretical investigation of the cold fusion phenomenon (CFP) in transition-metal hydrides/deuterides (CF materials). Thus, we have concluded that the generation of water trees in XLPE samples is caused by nuclear reactions induced by the CFP at around spherulites, a mechanism of which may be explained by the neutron-drop model proposed by us already. Furthermore, the new observation of the γ-ray emitted from ^{214}Pb and ^{214}Bi is explained by the TNCF model. The NT found in XLPE may have a direct relation with the NT's found in biological systems (biotransmutations) as discussed in another paper presented at this Conference.

(4) **H. Kozima, "Biotransmutation as a Cold Fusion Phenomenon,"** *Proc. of JCF16* 16-18, 216 – 239 (2016), ISSN 2187-2260.

Abstract

The nuclear transmutations in biological systems (biotransmutations) have been investigated for more than two centuries as reviewed in several books by Komaki and Kush and we have analyzed them tentatively by using our TNCF model developed for the cold fusion phenomenon (CFP) in transition metal hydrides/deuterides. 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. 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 decay of radioactive nucleus $^{137}_{55}$Cs, $^{140}_{56}$Ba and $^{140}_{57}$La in several bacterial cultures. In this paper, we have reexamined the data of biotransmutation and decay-time shortening of radioactive nuclides in microbial cultures from molecular levels and applied our TNCF model to analyze them. It is shown that the TNCF model successful to give a unified explanation of the CFP is applicable also to the biotransmutation.

3. ICCF20 will be held on October 2 – 7, 2006 in Sendai,

Japan

ICCF20 will be held on October 2 – 7, 2006 in Sendai, Japan and details are posted at ICCF20website;

http://iccf20.net/

The program of ICCF20 is decided and posted at following pages of the ICCF20 website;

http://iccf20.net/contents/Program.html