Power-Cell Analysis of Low Energy Nuclear Reactions (LENRs) Using Ultra-High Density Atomic Enablement: Review of ICCF-23 (23rd International Conference on Condensed Matter Nuclear Science)

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1. Introduction

Seeking for another kind of atomic energy incorporated with the characteristics of non-carbon emission energy source, the high density atomic enablement has been studied [1,2]. Recently, it was held for the 23rd International Conference on Condensed Matter Nuclear Science (ICCF-23) [3] in China which had been kept going on as the International Conference on Cold Fusion until 2006 after the amazing announcement in 1989 by Fleischmann–Pons experiment of Fig. 1 [4]. By the way, historically, Thomas Graham recognized the palladium's ability to absorb the hydrogens in 19th century [5,6]. Later, the term 'Cold Fusion' was used for the muon-catalyzed fusion in New York Times by Luis Alvarez [7]. Fig. 2 shows the classification of posters by topic in ICCF-23 where the Theoretical and Computational Studies topic has the most published area as 38% [3]. Table 1 shows the registrations by nations in ICCF-23 [3].

2. Methods

It is studied that the electrons behaviors are supposed to be a key role of the nuclear reactions in the atomic lattices where the cubic type features could be the place for the power-cell manufacturing of the commercialization. Fig. 3 shows the simulation platform for the progress of Ultra-High Density Cluster Enabled LENR by Dr. G.H. Miley [2]. There are configurations for (a) SRIM system main feature, (b) Ion distribution (100 keV, 10,000 deuterons), (c) Target Ionization (100 keV, 10,000 deuterons) and (d) Target Phonons (100 keV, 10,000 deuterons) in Fig. 4.

Theoretically, it is discussed for the models of reduction of Coulomb screening based on the Debye length and the swimming electron layer for understanding mechanisms in the deuterium saturated palladium [8]. This showed the stable very heavy nucleus as [1,8],

$$ {}^{306}_{126}X \tag{1} $$

If the compound nucleus is produced for a very short time (it is insisted of being less than 10 ~ 20 s), it would be excited as the 'Maruhn–Greiner maximum'. Then, the coonhound nucleus is [1,8],

$$ {}^{108}_{46}X + 156\mathrm{d} \rightarrow {}^{306}_{126}X + 38\,{}^{3}_{2}He + E \tag{2} $$

So, the simulations could give the clue for the nuclear reactions in the interested atomic lattices.

3. Results

It is shown that the LENRs are performed in the range of tens to hundreds of kiloelectronvolts [8]. Fig. 5 shows the graph for collision event where there are more collisions in lower energy in 10keV and higher deuterons of 10,000. There is the graph for several events in Fig. 6 where the higher ion range is shown in lower energy of 10 keV. In addition, there are more phonons with lower energy loss of 10 keV. Otherwise there are more ionizations with higher energy loss of 100 keV.

4. Conclusions

It is applied to the nuclear reaction for the power-cell manufacturing where the atomic lattice is able to be a place of the reaction. In the E-cat of the Defkalion Green Technologies, the power-cell manufacturing using LENR was undertaking for commercialization [9,10]. Another kind of LENR power-cell is proposed in Fig. 7. The room temperature based energy state could give the other kind of nuclear energy productions by the Low Energy Nuclear Reactions (LENRs). Although the efforts of seeking for the theoretical modeling has been performed, the phenomenal situations have expedited for the commercialization as a form of the battery. Especially, the usage in the space has the very plausible goal of LENR, because the compact size, lower power, and lengthen period energy are needed in the space for a deep space journey.

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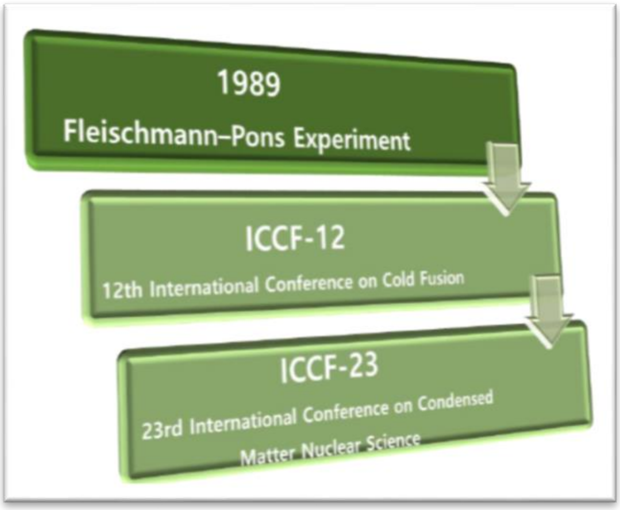


Fig. 1. Progress in ICCF [3,4].

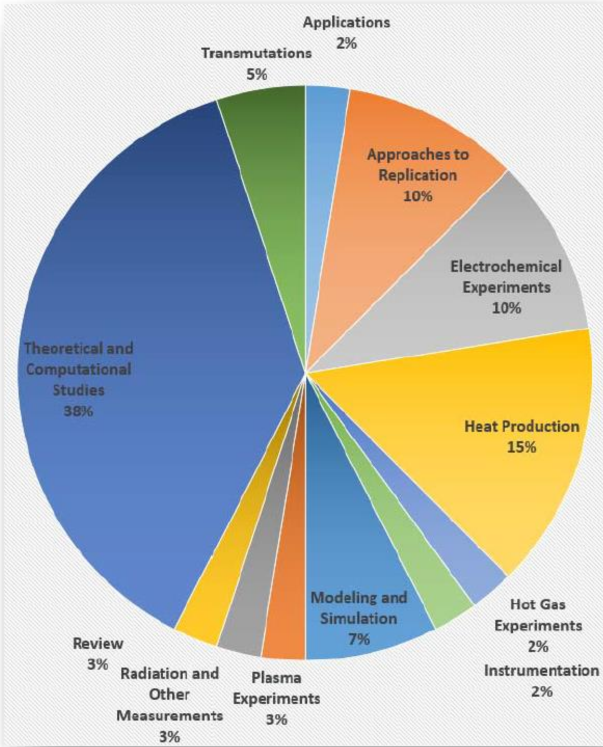


Fig. 2. Posters by topic in ICCF-23 [3].

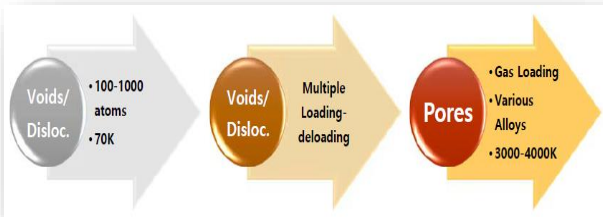
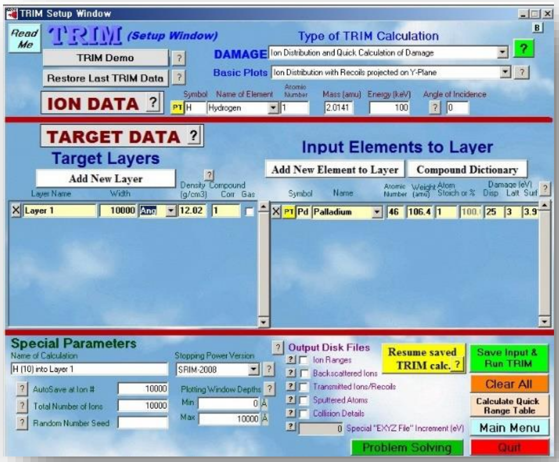
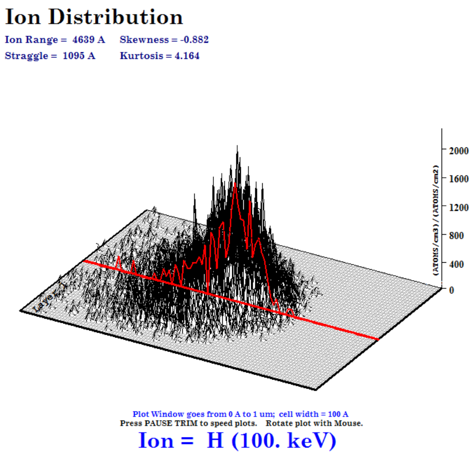


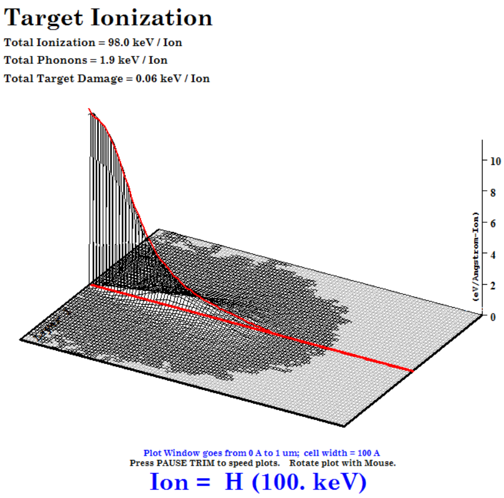
Fig. 3. Progress of Ultra-High Density Cluster Enabled LENR by Dr. G.H. Miley [2].



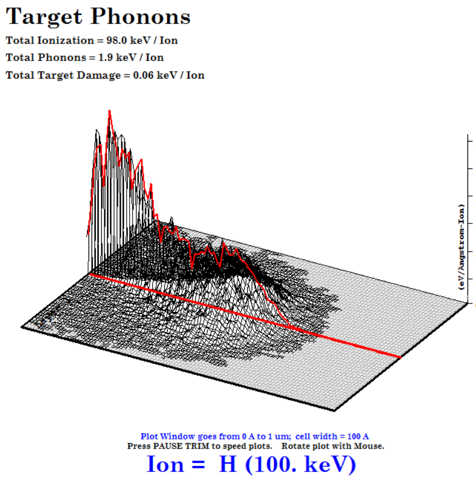
(a)



(b)



(c)



(d)

Fig. 4. Configuration for (a) SRIM system, (b) Ion distribution (100 keV, 10,000 deuterons), (c) Target Ionization (100 keV, 10,000 deuterons) and (d) Target Phonons (100 keV, 10,000 deuterons).

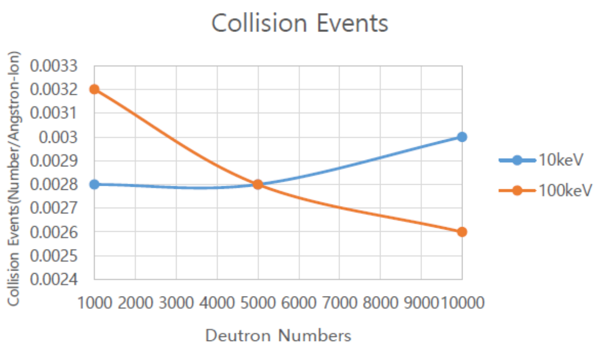


Fig. 5. Graph for collision event.

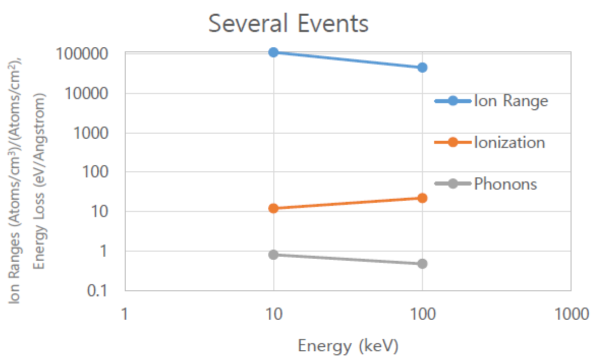


Fig. 6. Graph for several events (Ion Ranges (Atoms/cm^3)/(Atoms/cm^2), ionization and Phonons (Energy Loss (eV/Angstrom)).

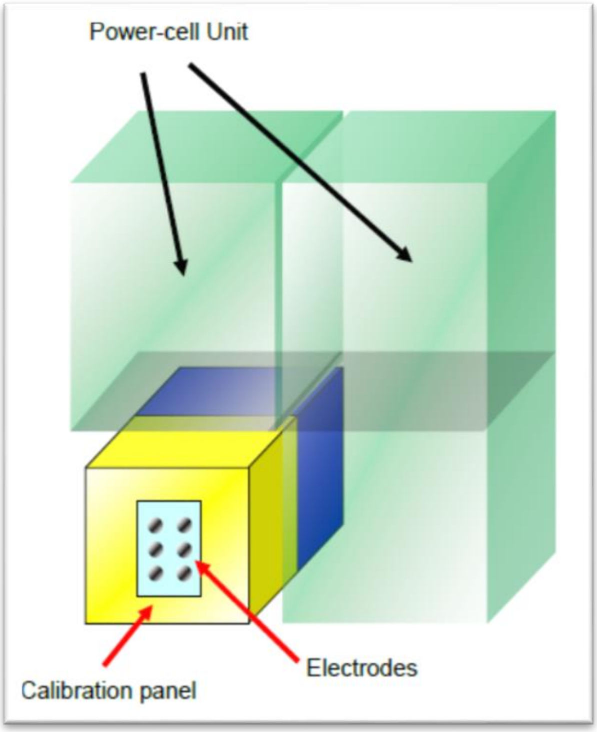


Fig. 7. Proposed power-cell units.

Table I: Registrations by nations in ICCF-23 [3].

No.	Country	Number
1	China	185
2	USA	99
3	Japan	18
4	India	12
5	Italy	11
6	Russia	11
7	Canada	8
8	France	6
9	UK	6
10	Australia	3
11	Hungary	3
12	Iran	3
13	Germany	3
14	Austria, Belgium, Kazakhstan, New Zealand, Switzerland, South Korea, Netherlands, Poland, Belgium, Brazil, Chile, Estonia, Finland, Denmark, Pakistan, Norway, Portugal, South Africa, Ukraine, etc.	Below 3
Total	34 Countries	407

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