2.16* Temporal Evolution of Explosion the Cold Fusion Phenomenon – Positive Feedback and Explosions observed in the CFP

2.16.1 Positive Feedback of Nuclear Reactions in the CFP

We have shown several examples of the bifurcation (or bifurcation-like behavior) of the CFP in experimental data sets in the above subsections. In these figures, the bursts of signals corresponding to the branch of Fig. 2.15 in Section 2.13.5 (or Fig. 2 of [Kozima 2008b]) may be realized by upper more effective positive feedbacks to increase the population or density than the lower branch.

Even if the bursts of the excess power generation in Figs. 2.3.3 [McKubre 1989 (Fig. 5)] and 2.3.4 [Kozima 2008d (Fig. 3)] in Sec. 2.13.2 and of the neutron emission in Fig. 2.3.2 [De Ninno 1989 (Fig. 2)] in Sec. 2.13.3 have finite heights, we may suppose cases where they increase without limit not restrained by any negative feedback thus resulting in explosions.

2.16.2 Explosions observed in the CFP

There are several reports of explosions in the CFP. The first group of the explosion is comparatively well analyzed [Zhang 1992, Biberian 2005]. In these cases, the Pd cathodes were narrow cylinders similar to that used by Dash et al. [Kozima 2007b].

The positive feedback observed in the excess power bursts appeared in Fig. 4 might be effective to raise the sample temperature especially due to the specific shape (cylinder) of the cathodes and finally to induce explosions in these cases [Kozima 2007b].

The second group of the explosion is composed of the cases observed by Fleischmann et al. [Fleischmann 1989] and by Mizuno et al. [Mizuno 2006]. These explosions occurred in experiments with cathodes with simple geometry in ordinary electrolytic system Pd/D_20 + LiOD/Pd and in plasma discharge system W/H_2O + K_2CO_3/Pt with a voltage of 350 V. These data may be explained by the similar mechanism to that sued in the first group while we do not have enough data to discuss them, further.

Another explosion observed in SRI reported by Smedley et al. [Smedley 1993] might be classified to the second group if it is related to nuclear reactions in the Pd cathode.

There is another case of an event (may be an explosion) written in the book by G. Taubes as follows, which occurred in Bockris's Laboratory, Texas A&M University on September 28, 1991.

"*Finally on September 28, Thursday, Wolf visited his basement lab and found that one of his cells, D6, the sixth of the heavy water cells, had popped. It had a syringe attached to recombine the evolving gases, and the top had blown off. Wolf found the catalyst beads scattered everywhere.*" [Taubes 1993 (p. 371)]

This case was not taken up hitherto as an explosion but we could classify it in the case of explosions observed in the CF research together with other cases listed up above.

2.16.3 Conclusion

Several events of the CFP have explained by characteristics of complexity assuming that the parameter n of the TNCF model corresponds to the variable of the recursion relations (1).

The TNCF model has been effectively used to explain semi-quantitative relations between observables in the CFP. The investigation given in this paper has shown again ability of the idea contained in the model to explain some characteristics of the CFP as complexity. This result clearly shows that events in the CFP does not have quantitative reproducibility but qualitative or statistical one common to many-body systems.

The assumption of the parameter n_n as a variable in the recursion relations (1) will be investigated in following works.

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