Status of cold fusion research in Japan

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In Japan, the Condensed Matter Nuclear Science (CMNS) works have been centring around the Japan CF-Research Society (JCFRS) established in 1999. Recently, about 10 research groups are actively working in the CMNS field, and have been exchanging information mainly in the annual meetings of JCFRS in addition to the International ICCF conferences. Table 1 indicates the approach of these groups to CMNS. For details, refer to the recent issues of the proceedings of JCF meetings[1] and the *Journal of Condensed Matter Nuclear Science*[2].

For many years efforts have been exclusively devoted to clarification of the underlying physics of excess heat phenomenon and isotopic composition change. Recently, however, an entrepreneur group, Clean Planet Inc., has entered into the CMNS field in Japan, and joined Mizuno to form the above-mentioned group and made a presentation at the LANR/CF Colloquium, at MIT in March 2014. In their work they used glow discharge to form surface nanostructures on nickel mesh wires that are to be subjected to deuterium exposure. They claimed excess power on the order of kilowatts with a coefficient of performance of 1.9. Confirmation of their claim by third parties is highly expected.

Iwamura, Mitsubishi Heavy Industries, Ltd. also presented a paper at the 2014 LANR/CF Colloquium. The group is performing advanced studies on deuterium permeation through nano-structured Pd multilayer films not in the gas phase, but in the liquid phase. The purpose of adoption of the latter is to increase the deuterium influx and therefore the number of atoms to be transmuted, typically Cs, with commercial-level applications in mind, i.e. radioactive waste disposal and energy source.

The Technova–Kobe University group has been examining physical basis of anomalous heat phenomenon in nano-composite metals under hydrogen isotope gas loading with high-precision mass flow calorimetry. Recently, their interest has been shifted also to nickel-based material from the palladium-based one in consideration of commercialization. Repeated excess power of 10–20 W, although not high enough, has been reported.

As for the theory, the Takahashi model of cluster condensation under platonic symmetry can make quantitative discussion, and is getting more and more researchers positively evaluating the theory.

Table 1. CMNS research groups in Japan. The approaches are categorized to Electrolysis (E), gas loading (G), discharge (D), permeation (P), beam-target interaction (B) and theory (T)

	E	G	D	P	B	T
Mizuno, T., Yoshino, H. and Igari, E. [Hydrogen Engineering Application and Development Co. – Clean Plant Inc.]	•	•	•			
Narita, S. *et al*. (Iwate University)	•	•	•	•		
Kasagi, J. *et al.* (Tohoku University)					•	
Miura, H.						•
Tsuchiya, K. *et al.* (Tokyo National College of Technology)		•				•
Numata, H. (Tokyo Institute of Technology)	•					
Sawada, T. (Nihon University)						•
Iwamura, Y., Tsuruga, S. and Itoh, T. (Mitsubishi Heavy Industries)				•		
Kozima, H. and Tada, M. (Cold Fusion Research Laboratory)						•
Hioki, T., Takahashi, N., Kosaka, S., Ohshima, S. and Motohiro, T. (Toyota Central R&D Labs)		•		•		
Cook, N. D. (Kansai University)						•
Takahashi, A. and Kitamura, A. (Technova Inc. – Kobe University)		•				•

1. Proceedings of JCF meetings; http://jcfrs.org/proc_jcf.html
2. *J. Condens. Matter Nucl. Sci.*, http://www.iscmns.org/CMNS/publications.htm

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