Applying the Scientific Method to Understand Anomalous Heat Effect

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Scientific methods in nuclear science are proposed to understand anomalous heat effect: (1) Neutrino Detection; (2) Internal Conversion Electrons; (3) RF emission and magnetic field fluctuation; (4) 3-Deuteron reaction; (5) Solid State Nuclear Track Detector(CR-39); (6) ^{6}Li+p resonance at low energy.

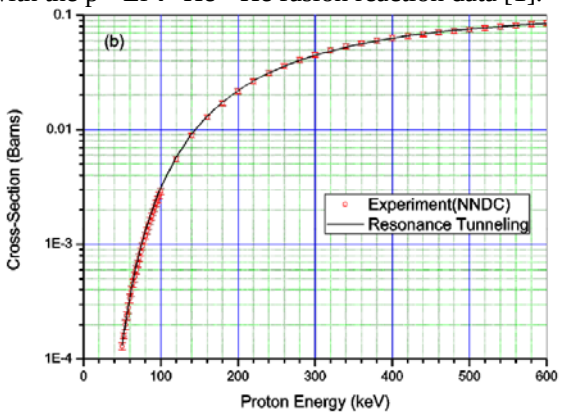
NEUTRINO Resonant tunnelling has been proposed to solve the 3 puzzles of Huizenga: i.e. penetration of Coulomb barrier, incommensurable neutron and gamma emission with excess heat. The weak interaction is proposed to compete with the strong nuclear interaction and the electromagnetic interaction. In other words, weak interaction is picked-up for matching the Coulomb barrier in terms of the selectivity of resonance. Then, the necessary nuclear product is neutrino. It was thought impossible to detect neutrino emission in order to confirm this weak interaction. The recent progress in neutrino detection will be reported, and the requirements for a preliminary experiment would be discussed

INTERNAL CONVERSION ELECTRONS If anomalous heat effect is caused by nuclear energy, it must be transferred from nuclei to the surrounding electrons eventually. A possible mechanism is the internal conversion electron which is supposed to win over the high energy gamma emission. High nuclear spin and dense energy levels are necessary conditions for the internal conversion electrons to win over the gamma emission. The Defkalion's **RF emission and the strong magnetic field** fluctuation after the excitation of high spin Rydberg state were the possible hint in this direction. A calculation of internal conversion coefficient for the case of resonant tunnelling in metal-hydrides (deuterides) is desirable.

3-DEUTERON REACTION **A** long-lifetime resonance state is supposed to be formed as a result of the selective resonant tunnelling. It might be detectable using an incoming beam to interact with such a long-lifetime state. The 3-deuteron reaction products might be an evidence of this d+d resonant tunnelling.

SOLID STATE NUCLEAR TRACK DETECTOR(CR-39) Linear Energy Transfer (LET) is applied to analyze the CR-39 data to show clearly the reproducibility of the co-deposition experiments initiated at SPAWAR.

LITHIUM-6 + PROTON FUSION REACTION DATA Selective resonant tunnelling has been proved to be consistent with the p+^{6}Li→^{4}He+^{3}He fusion reaction data [1].



[1] Xing Z. Li, Zhan M. Dong, Chang L. Liang, "Studies on p+^{6}Li Fusion Reaction using 3-Parameter Model," J Fusion Energ. Vol.31, pp.432–436, DOI 10.1007/s10894-011-9483-3. (2012)