Stimulation of LENR in Hydroborate Minerals Under the Action of Distant High-Frequency Thermal Waves

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It is well known that for realization of LENR in solids it is necessary, at least, the satisfaction of two threshold conditions: a) high level of loading of such solids by hydrogen isotopes; b) presence of optimal nonstationary structural elements in the volume of these solids which essentially (by many orders) increase the probability of LENR.

Such requirements lead to the the necessity of complex, long and costly technological operations to load of working media by hydrogen and the subsequent formation of conditions for low-energy fusion at low energy.

This report presents the results of a study of natural objects (hydroborate minerals) th**a**t automatically satisfy both these requirements without additional actions and processing. These minerals contain (consist of) hydrogen and boron, do not require pre-loading, and are a very effective medium for one of the most attractive nuclear reactions $B^{11}+p=3He^4+\Delta E$ with large release of energy $\Delta E = 8.7\,MeV$ and practically full absence of induced radioactivity.

At standard conditions of a pair interaction of free nuclei, this reaction has a maximal cross-section under relative energy of colliding particles $T_{pB^{11}} = 675\,KeV$. This is large energy and usually, to obtain it, highly-current ionic accelerators are needed.

Our research is fundamentally different and does not require any special preliminary operations.

In our experiments, we use a special undamped thermal shock waves [1-4] of small amplitude to form a special secondary acoustic intracrystalline shock waves. We discovered and investigated these undamped thermal waves at a great distance in numerous successful experiments [5,6]. Action of these waves lead to formation of coherent correlated states of protons that are situated (localized) in intracrystalline nonstationary potential wells deformable under the action of the waves. In these states, the proton energy fluctuation in usual cold (room temperature) minerals can reaches 30…50 keV and more [7-10].

During the test experiments with using of external distant source of undamped temperature waves we have confirmed the correctness of our concept and registered numerous fast alpha-particles with maximal energy about $E_{\max} \approx 2.9\,MeV$ accompanying these reactions.

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