Rossi is known to have purchased 62Ni a few years back from an isotope producer. Also, another source claims to have provided some amount of 62Ni to Rossi. So we know that Rossi obtained some 62Ni. This does not mean that the 62Ni is not bred in Rossi's reactions - it may be that the reaction breeds 62Ni and that could be why Rossi has no need any longer to buy 62Ni.

Many in the field claim that there is nothing special about 62Ni from a LENR perspective and this is a ruse by Rossi to keep other researchers distracted. It is likely that during Rossi's early development that he and Focardi explored which isotopes of Ni (if any) were special in the process.

deuterium gas. According to a second theory, the two trapped deuterium nuclei go through a quantum tunnel to reach the lower energy state, i.e., to form a ^{4}He nucleus.

[003] Although these experiments have been replicated around the world, efforts to generate excess heat in a consistent manner have not been successful. Scientists have explored different conditions in which generation of excess heat can be enhanced, but research in this field has largely been inconclusive.

Summary

[004] The present disclosure relates to methods and apparatus for enhancing exothermic reactions for generating anomalous heat.

[005] In some embodiments, an exothermic reaction between a hydrogen gas and a transition metal inside a reaction chamber is enhanced by plating the reaction chamber with an enriched product of the transition metal. The enriched product of the transition metal has an isotopic distribution that varies from the natural abundances of the stable metal isotopes. The high concentration of the isotope in the enriched product is achieved using centrifugal separation, foam fabrication, spin casting, electromagnetic calutron, laser separation, or other isotope enrichment techniques.

[006] In one embodiment, the transition metal is palladium and one of the palladium isotopes, ^{102}Pd, ^{104}Pd, ^{105}Pd, and ^{110}Pd, has a higher concentration than its natural abundance.

[007] In one embodiment, the transition metal is nickel and one of the nickel isotopes, ^{58}Ni, ^{60}Ni, ^{61}Ni, ^{62}Ni, and ^{64}Ni, has a higher concentration than its natural abundance.

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Palladium Isotope Separation under High Mechanical Stresses Induced in Pd Foils upon Loading with Deuterium

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Abstract—The effects of a significant decrease in the sputtering rate and of the symmetrical separation of the isotope pairs ^{108}Pd–^{105}Pd and ^{110}Pd–^{104}Pd at depths up to 500 Å are experimentally detected in Pd specimens saturated with deuterium during electrolysis (i.e., having a high concentration of internal stresses). These effects are shown to be qualitatively explained using the concepts of isotope separation by centrifugation and diffusion with allowance for defects and mechanical stresses that appear in the near-surface Pd layer during deuterium penetration. *© 2003 MAIK "Nauka/Interperiodica".*

1. INTRODUCTION

The interaction of hydrogen (deuterium) with metallic Pd is known to cause the formation of PdH_x hydrides ($x \sim 0.7$), which is accompanied by the generation of numerous structural defects [1–3] and changes in the shape and linear sizes of specimens [4] and their electrophysical properties [5]. The hydrogenation of Pd leads to extremely high vacancy concentrations in specimens (more than 20% of their volume) [6]. The formation of $PdH_{0.7}$ hydrides in cold-rolled Pd foils is accompanied by the generation of dislocations with a density of 2×10^{11} cm^{-2} [4]. These structural changes during hydride formation in metallic Pd (internal loading) indicate the generation of giant mechanical micro- and macrostresses in the metallic crystal lattice, which are likely unachievable by the traditional methods of external mechanical loading of metals [7].

The generation of such high mechanical stresses in Pd during its hydrogenation should cause not only the activation of diffusion of defects and impurities but also the self-diffusion of Pd isotopes belonging to the metallic matrix. If the mobility of Pd atoms is sufficiently high, the mechanical stresses affecting them could result in the local separation of the matrix isotopes in the zones of stress concentration (dislocation loops, Frank–Read dislocation sources, vacancy aggregates, and so on). The authors of [8–11] detected significant deviations of isotope compositions from the stoichiometric values in the surface layers of semiconductors and metals with a high hydrogen affinity during ion bombardment. However, they did not relate the changes in the isotope compositions to the effect of surface mechanical stresses.

Lipson *et al.* [12] found that irradiation with an ultraweak flux of thermalized neutrons (UFTN) at a neutron concentration of $\sim 10^{-3}$ cm^{-3} (flux $\Phi_n \sim 10^2$ neutrons/(s cm^2), energy $E_n \sim 60$ meV) noticeably increased the level of mechanical stresses in loaded crystals [13], in particular, in electrochemically saturated crystals with hydrogen [12]. Therefore, the application of an UFTN during electrochemical loading of Pd can increase the mechanical stresses and favor isotope separation in it.

The purpose of this work is to experimentally observe the effect of Pd isotope separation under high mechanical stresses generated during saturation of Pd with hydrogen. In some cases, the stresses are enhanced by the irradiation of specimens with an UFTN.

2. EXPERIMENTAL

To analyze the isotope composition of Pd specimens, we used secondary-ion mass spectrometry (SIMS). A CAMECA IMS 5f device in the high-resolution mode (1 : 20 000) allowed us to reliably select all Pd isotopes (102–110) and separate them from the hydrides (deuterides) that correspond to these isotopes, have similar masses, and enter into the composition of the secondary-ion beam. Using SIMS, we could also obtain Pd isotope depth profiles (to a depth of 0–0.16 μm) and determine the sputtering-rate depth profiles. The typical etching rate was 4.1 Å/s at a primary-ion beam current of 10 nA (O^{2+} ions with an energy of $E = 8.0$ keV). The error in SIMS measurement of the Pd isotope concentration at a depth $h > 100$ Å was less than 1 at. %. The error for surface layers of thicknesses comparable to the roughness of specimens (<100 Å) is

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