

2000 ICCF8

THE PROBLEM OF REPRODUCIBILITY OF EXPERIMENTS IN SEARING DISCHARGE AND PROCESSES ACCOMPANYING THE BOMBARDMENT DEUTERIUM IONS.

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ABSTRACT

Discusses the problem of reproducibility of experiments in searing discharge and electrolysis, the possibility of assessing the contribution of the nuclear and non-nuclear processes change the isotopic and elemental composition of irradiated material.

The results of measurement of charged particles after level off. For different materials and designs the cathode and conditions of the experiment, the current varies from 10^{-6} A/cm² surface in the first 10 minutes before 10^{-13} A. duration of current emissions amounted to 30-100 minutes dependent on the conditions of the experiment.

Study on x-ray films showed the existence of several series of unusual objects length up to several millimeters, including rotation of dvuhzahodnyh type spirals.

THE PROBLEM OF REPRODUCIBILITY

Good reproducibility is always the most an important problem in all areas of science and technology. So the question is why researchers in similar circumstances receive various experiments results, attracts increasing attention, both for in electrolysis experiments, and experiments in the gas searing.

The pros and cons has not yet sufficiently clear. However, issues of training surface configuration and surface topography, the contribution preferred spraying lighter elements with a surface, the contribution chemical spraying are attracting increasing attention. It is possible to It would be to believe that in conditions of ionic bombardment of the contribution pre-emptive spraying lighter elements and isotopes must to be more significant.

Consider the possible change processes affecting the isotopic and Elemental composition of the surface:

- pre-emptive spraying lighter isotopes;
- diffusive separation;
- gradient concentrations;
- gradient $\nabla C_{\text{naprjazhenij}}$;
- transferring items from construction details;
- Introduction (implantation) elements of the composition of gas Wednesday.

However, experimental data and calculations, confirmed serious research in the energy range $0.5 - 5$ keV change obogashhennosti surfaces in binary alloys were small and often not go beyond measurement errors. Normally in single-phase metal alloys surface is enriched with more target component low dispersion. The change in the composition of surfaces

ion bombardment resulting from the difference between the masses and surface energy connection, for pure metals. Contribution of preferential spray light isotopes and enrichment, respectively, heavy isotopes in the process of interaction of charged particles with a solid for case when bombardirujushhego ion mass and target atoms close. For case Pd this value may be proportional to the $(M_{Per}/MA)^{1/4}$ and be, for example, thousandths of a percent [1, 2].

Account must be taken of the anomalous flow of processes detected under the influence of hydrogen ions. These include the accelerated diffusion, the formation of complexes of ions of hydrogen with various types of defects accelerated takeaway impurities in some conditions (if there are defects of a certain type) and fastening of impurities (including gas impurities) on defects in other conditions [3, 4].

As is well known, irradiation of materials slow energy ions accompanied by the following occur simultaneously at the atomic level physical processes:

1. knocking atoms from lattice sites, spraying and pereosazhdenie atoms knocked off the surface;
2. introduction of atoms surrounding Wednesday.

Spraying and pereosazhdenie atoms, knocked off the surface, leads to the formation of vacancies and mezhuzel'nyh atoms, forming clusters vacancies and atoms mezhuzel'nyh and next to the formation of defects the dislocation type (dislocations, loops and nets dislocations) and pores.

Spraying on defects that were irradiated materials to irradiation and newly formed, leads to changes in topography surface, formation of cones, ledges, "moustache". The appearance of the surface defects, such as moustache and cones can be the reason for the change 3 Worried 2000 ICCF8 en

current density and leakage in the area, and mikrodog Ostri micro explosions at surface.

Mikrodugi and microexplosions, in turn, may cause the advent of high compressive and tensile stresses in the surface layers microvolumes instantly and rasplavljaemogo Solidifying these mikroob'jomah material. Voltage can lead to the formation of dislocations and, consequently, intensify diffusion processes accelerated by orders of magnitude long-range contaminants on dislokacijam.

Dispersion in mikroob'jomah material on defects may lead to change of the chemical composition of these volumes-redistribution impurities.

MEASUREMENT OF THE FLOW OF NEGATIVELY CHARGED PARTICLES FROM CATHODE DISCHARGE AFTER SWITCHING OFF SAMPLES

Evidence of "life after death", by definition, Prof.

Flejšmana [5] (his article called "Heat after death") can serve as a registration of negatively charged particles, departing from the irradiated deuterium ions sample after glow off. "Life after death "and, accordingly, its nuclear nature is confirmed by the many manifestations in searing, as has previously been published in the proceedings 1-7 of international conferences on cold fusion (ICCF1-ICCF7) and

materials 1-7 Russian conferences on cold fusion and cold transmutation of nuclei.

At previous Russian and international conferences have also been published results of the author indicating the radiation samples irradiated with ions of hydrogen and deuterium in glowing discharge and zasvechivajushhih x-ray film [6.7].

This paper presents some results of measurements the flow of charged particles from the cathode, after turning off the current samples discharge.

Measurement of particle flow tests were conducted using amp jelektrometricheskogo U5-6. An electrometric amplifier It is intended for measurement of permanent and slowly varying currents positive or negatively charged particles in the range of $1 \cdot 10^{-13}$ before $2 \cdot 10^{-6}$ A. work of the amplifier-principle 6 U5 measuring weak currents-largest known voltage by resistance. There are 4 Worried 2000 ICCF8 en

three overlapped measurement limit: (I) from $1 \cdot 10^{-13}$ up to $1 \cdot 10^{-10}$ (A); (II) from $1 \cdot 10^{-12}$ up to $1 \cdot 10^{-8}$ (A); (III) from $1 \cdot 10^{-9}$ up to $2 \cdot 10^{-5}$ A. the first range measurement error is $\pm 10\%$, the second and third bands $\pm 5\%$. Amplitude value low-frequency fluctuations of voltage corresponds to noise I measurement range $3 \cdot 10^{-15}$ - $5 \cdot 10^{-16}$ And, for range II- $1 \cdot 10^{-13}$ - $2 \cdot 10^{-14}$ And, (III) the range $< 1 \cdot 10^{-11}$ A.

Calibration of charged particle measuring systems has been carried out in a vacuum on tritievoj targets established instead of sample in vacuum bit Chamber.

Electrometer registered current of $\sim 5 \cdot 10^{-11}$ And from the tritievoj target area $\sim 1 \text{ cm}^2$ activity $4.1 \sim 10^9$ see -2 in a vacuum $1 \cdot 10^{-4}$ Some Torr. the measurement results are shown in Fig. 1

Fig. 1

Current from samples "in situ" after two minutes, Glow Discharge switch off.

Current from the sample placed on the cathode, through 2-(e) minutes After switching off. 1-17-the numbers of samples.

1-5 Pd; 8 PdRu; 9 Ag; 10-11 PdPtW; 13-14 Cu-Pd; 16-17 Mo.

Current jemitiruemyj samples of Pd, ranged from $1 \cdot 10^{-6}$ before $2 \cdot 10^{-13}$ A. The duration of emission of the first few minutes was usually much higher. However, some samples of sluggish exuded current smallness to the limit the sensitivity of the device.

It should be noted that in the process of pumping deuterium when changing the residual pressure in the Chamber from $1 \cdot 10^{-1}$ Torr to $1 \cdot 10^{-4}$ Torr current from sample Ag increased on 20% \sim for 15 minutes of vacuuming and was $\sim 1.2 \cdot 10^{-6}$ A.

The sample LaNi in close conditions during vacuumization the current decreasing for 7 minutes nearly doubled.

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In the alloy PdPtW current grew in ~ 2 times for 20 minutes after shutdown and accounted for $\sim 4 \cdot 10^{-5}$ A. in the alloy PdPtW the first 1-2, 5 minutes

After switching off discharge there were unstable partly increasing jemitiruemogo thread. Flow rate initially dropped from $\sim 5 \cdot 10^{-6}$ (A) up to $\sim 4 \cdot 10^{-7}$ But then increased to $\sim 1 \cdot 10^{-6}$ A. the conditions under which thermal measurements showed higher values (with the same power input measured temperature difference at the cathode was higher at 10-20 °C), jemitiruemyj current at 5-7 orders of magnitude below $\sim 10^{-7}$ A and $\sim 10^{-7}$ But, respectively. Certain results are on Ri. 2.

Fig. 2

Current from samples "in situ" after two minutes, Glow Discharge switch off.

1-17-samples number.

Current from the sample placed on the cathode, after 2nd minute After switching off. 1-17-the numbers of samples.

1-5 Pd; 8 PdRu; 9 Ag; 10-11 PdPtW; 13-14 Cu-Pd; 16-17 Mo. Talk on the axis "y" has the value $\times 10^{-14}$ (A)

It should be noted that current emission termojelektronnoj Pd and Mo is 10^{-21} and $\sim 10^{-23}$ Acm⁻² at a temperature of 500 about S, respectively. Lower temperature current falls even more.

THE STUDY OF OBJECTS ON X-RAY FILMS.

For registration of radiation used photometric method

x-ray films that are installed with a series of screens as in vacuum

Chamber, and outside of it. In addition to the overall black colour film marker with input screens

observed the diffraction spots and traces of unusual form, which

I would like to draw particular attention.

These tracks were observed on the x-ray films, placed on the distance 350

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millimeters from the sample irradiated by deuterium ions in site. Some tracks were

similar the tracks in Wilson's chamber, observed traces of such pursuit,

observed in the cell Wilson and bubble Chamber: together

tracks from "light-struck" spots, sometimes relatively rectilinear, sometimes

curved, sometimes as particle tracks would be rejected by a strong

electric field.

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Fig. 3 Unusual tracks on rengenovskoj film

hosted inside and outside the vacuum Chamber after

processes in the dejterievom glowing discharge

(A)

(C)

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DISCUSSION

Measurement of mass change in the balance of the (chemical) composition, thermal measurements and

energy, broken with radiation, it is difficult to separate the contribution of processes occurring on

Atomic and nuclear levels.

Although not exactly measurements, will always be an element of uncertainty in accuracy for the entire set of observable processes.

Consider at least a part of a complex set of processes running simultaneously on the cathode glow discharge.

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Possible reasons for neidentichnoj reproducibility-stochastic processes

The Reason Is A Consequence Of The Action

1 2 3 4

1 Education

structural defects:

vacancies and their

clusters, mezhuzel'nyh

atoms, formation

long clusters

dislocations and grids

dislocations

Preemptive

spraying on

structural

defects

Crystal

Lattice

Structural defects

macrolevel processes

atomic level;

Nuclear processes

micro-

vnutriatomnye processes

2 Preferred

cluster

(accumulation)

deuterium on defects

Crystal

Lattice in the process

ion implantation

Local

changes

isotopic and

Elemental

the composition of the

Preferred

spraying-separation

isotopes in the range

energies $< 1 \text{ keV} < \text{is equal to or}$

10% and separation elements

only with the largest difference

in bulk (for

isotopes with masses of 100 this

the amount will reach thousands of
share%)

3 separation of elements with
large differences in
mass number and
local changes
structure elements

local
changes
electrical and
magnetic fields
local changes
excitation conditions
kristallichskoj lattices
the existence of local
zones of nuclear reactions

4 the existence of
local zones of nuclear
reactions

local
black colour
x-ray
films ("hot
point ")
uneven blackening
x-ray films from
irradiated with ions
cathode designs

certificate
stohastichnosti flow
nuclear reactions
the inability to get
identical results on
changing element and
isotopic composition and
thermal effects

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5 the existence of
local zones of nuclear
reactions

education
local
mikrosegregacij
impurities and
"new" items

1. proof-point
accumulation of impurity
items in mikrozonovom
rentgenospektral'nom

analysis

2. the difference spectra with
masspektrometricheskom
analysis after the experiments
in searing discharge and
source

6 change of topography

surface growth

whiskers, cones

possible

local

synergistically

leaking

processes result

to processes

dissolution and

leakage

nizkojenergetichesk

their nuclear

reactions

8 the formation of craters

in places mikrodog

possible

local

flow

processes of synthesis-

the collapse of the

9 formation of cracks

flow

processes of synthesis-

the collapse of on

uskoritel'nomu

mechanism

For all the above electrolysis experiments also processes povtrorjajutsja with more
local processes in bubbles on the cathode.

Structural defects-macro vneatomnye processes and nuclear processes
vnutriatomnye processes and probably change electronic subsystems of Crystal
the lattice can affect more subtle processes.

Type kinetic processes, mikrodog occur as in electrolysis and at ion
bombed. They are illustrated to confirm instability

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process. In addition, the emergence of them can stimulate the processes of nuclear level and
be the trigger.

Stochastic flow of nuclear reactions, the inability to get identical
results by changing the element and

isotopic composition and thermal effects to date indicate
the need for further study.

The inability of some parties stressed the phenomenon, associate all facets of the process and
have

complete energy balance may lead to the need to better studying the phenomenon and may be the emergence of a new physics knowledge. The author is grateful for the interest and discussion on its member. Fediku told an RAS I.i., Prof. Babad-A.a. Zahrjapinu and Prof. Mr. Rodionov Used Literature.

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