

Radioactivity of the Cathode Samples after Glow Discharge.

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We registered the residual radioactivity of the cathode foils (Pd, Ag, Nb and other materials) after irradiation at the glow discharge. The samples were irradiated by proton, deuteron and argon, xenon ions with low energy. We consider that main activity is beta emission from samples after experiments /1/. Samples were placed in the contact with X-ray films. Semiquantitative radiographic method with measurement of the degree of blackening x-ray films by micro photometer was used. We made the estimate of beta activity of the samples. The x-ray film was calibrated with use of a tritium beta source with activity of $4.1 \cdot 10^9 \beta \cdot s^{-1}$ (Ti implanted). The characteristic curve from this film was gotten in vacuum chamber. The high energy radiation was compared with ^{90}Sr radiation ($E_{\beta} \sim 546 \text{ keV}$). Within $\sim 10^3 \text{ s}$ after discharge termination the second x-ray film exposure corresponds to equivalent dose of $(1.5-4.5) \cdot 10^{10} \beta/\text{cm}^2$ from ^{90}Sr . Activity of the isotope(s) with high radiation energy is estimated as corresponding to ^{90}Sr activity of $\sim (2-5) \cdot 10^4 \beta/(\text{cm}^2 \cdot \text{s})$.

Earlier we said that there were at least two isotopes with different energy: first $< 20 \text{ keV}$ and second $(0.1 \dots 0.5) \text{ MeV}$ /2/. Now we would like to note that activity was not observed for ion irradiated zones some times, when high ion's density was at the experiments with compound cathode samples (put together of the 2-7 foils from different materials). In this case high energy activity isotope was observed only in the second layer of the X-ray film.

Activity of the irradiated surface in comparison with non irradiated surface was less to 2-10 times (Fig.1,2). Increase of the radioactive isotopes energy were registered after experiment only during 2-4 hours (Fig. 3).

When we took other cathodes (Ag, Nb, Ti... instead of Pd), its activity was less Pd to 10-100 times under equal conditions of the experiments. Activity Ag, Nb, Ti was less $10^2-10^4 \text{ cm}^{-2} \text{ s}^{-1}$.

Activity of the Pd films under Ag, Nb and others was more to 10^5 - 10^6 cm⁻²s⁻¹ (Fig.2).

We observed increase of the sample radioactivity during the first several hours after experiment and its decreasing later. It means, that radioactive chains of the nuclear decay was registered.

We did not observe activity of the Ag cathode after deuterium ions and watched the Pd cathodes' activity after Ar, Xe ions under other equal conditions of the experiment. Thus we registered the irradiation in the result of the blackening films that was not the result of the formation tritium or chemical interaction H, D, T with X-ray films.

We have to note the following main results:

- increase of the sample radioactivity during the first several hours after experiment and its decreasing later;
- presence of the radioactive nucleus with different energy from units to hundreds keV on the cathode ;
- radioactivity of the samples after Ar, Xe irradiation presence.

As the result we can suppose that we observed radioactive chains of the nuclear decay. It means that we have more universal phenomenon than reactions in the system Pd-D (passing nuclear process during and after irradiated low energy ions).

References:

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2. A.Karabut, Ya.Kucherov, I.Savvatimova "Nuclear product ratio for glow discharge in deuterium". Physics Letters A, 170, 1992, 265-272 .
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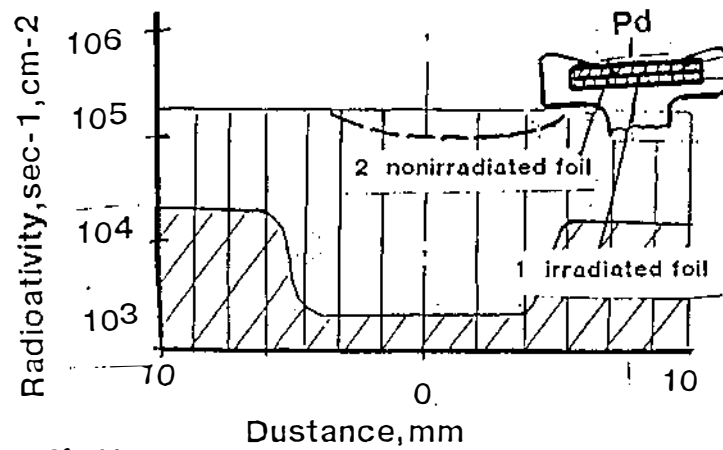


Fig. 1 Activity of the foils of the complete cathode after experiment in the deuterium (Pd+Pd)

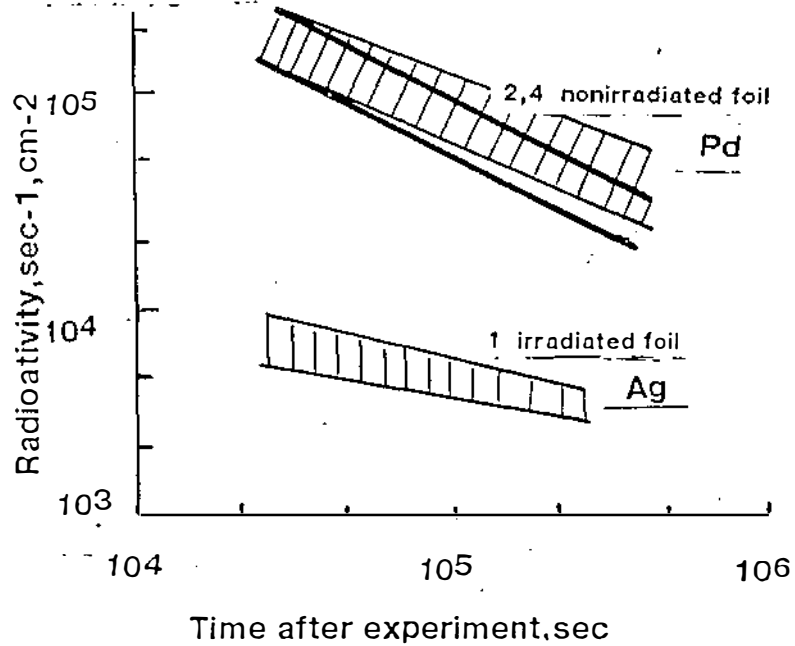
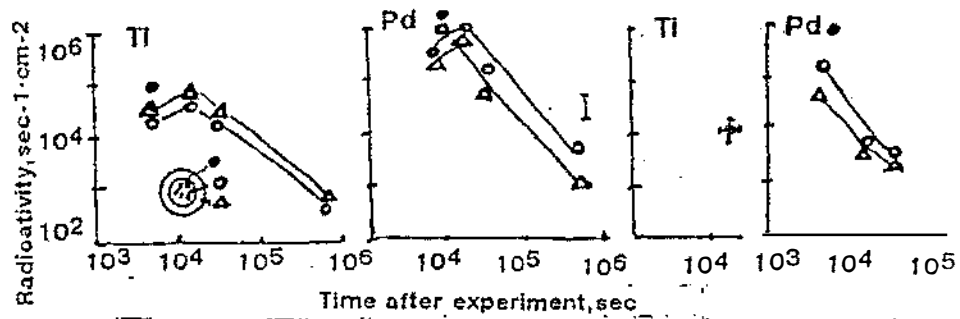
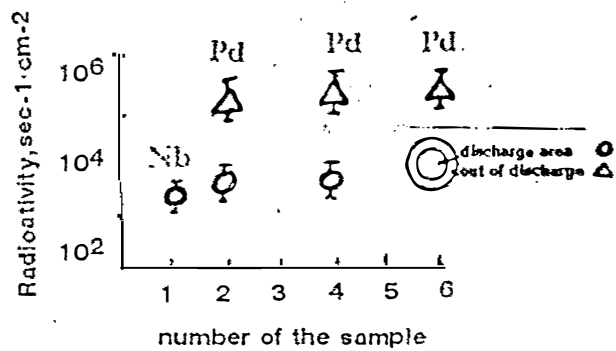


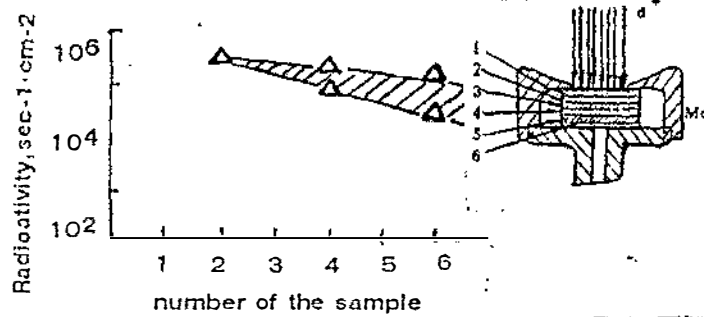
Fig. 2 Activity of the foils of the complete cathode after experiment in the deuterium (Ag+Pd+Ag+Pd)



a



b



c

Fig. 3 Activity of the foils of the complete cathode after experiment in the deuterium (Ti+Pd+Ti+Pd)

1-Ti; 2-Pd; 3-Ti; 4-Pd. ● specks ○ center of the sample
 △ under screen area
 (Nb-Pd-Nb-Pd-Nb-Pd)

1 - irradiated foil, 2,3,4,5,6 - nonirradiated foil
 1,3,5 - Nb; 2,4,6 - Pd
 ○ - discharge area, △ - out of discharge
 b - $2.3 \cdot 10^4$ second after experiment,
 c - $4.5 \cdot 10^4$ second after experiment,