

Observation of the Track-Pit Swarms in the Plastic Track Detectors exposed in Space

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For further check of the pit nature Erzion hypothesis [1] it has been executed the precise, at high 1200-multiple magnification in optical microscope attendance of a large square in the Plastic Solid-State Track Detectors (PSSTD), which were satellite exposed in Space [2]. It was analyzed films of PSSTD CR-39 and CN-85 from different piles and satellite flights. By this manner on the total of searched PSSTD surface about 20 cm² have been primarily discovered a range of the specific, compact pit groups, characteristics for which indicate that their source are the swarms of the not-knowing origin particles in the track-detector matter.

Pite swarms observation on the PSSTD CR-39.

Some examples of the particularly express provision visual observed of different types of the track-pit group pictures are presented in Fig. 1 and Fig. 2.

All determined pits in the first approximation can be separated in three groups due to size intervals: 0.5-1, 1-2 and 2-3 μm. Relative number of these pit-types in different pit-groups is varied (see Fig. 1 and 2).

In each of the observed track-pit groups it was recorded near 100-200 of pits that corresponding to the surface density of (2-10)×10⁶ cm⁻². These values in comparison with the average pit-like points on the same surface of CR-39 plate by two-three orders of magnitude are higher.

Pite swarms observation on the PSSTD CN-85.

With the purpose of detection of events of the nuclei stops and, if it is probable, collinear set of the congestions located pites there is begun detailed viewing and analyzing of the No 2-5 plate surfaces from a stock arrangement of FB-19. By present time viewing about 2 sm² from a total area of the pile equal 18 sm² was lead.

As a result of layer-by-layer investigation of the exposed CN-85 stock arrangement PSSTD it was observed a pit swarm exactly correlated with the end of track formed by high ionizing primary charge particle. One precise case was found, when the congestion of the pites group of different diameters (from 1-2 micron up to 8-10 micron) precisely corresponds to a moving direction of the charged particle that has stopped in the plate CN-85. . Schematically this event and the geometry of a relative positioning of a track and pite group, generated on two sites of a surface contacting among themselves of the plates No 4 (the bottom surface) and No 5 (the top surface), are shown in Fig. 3 and 4.

Detailed examination of CN-85 plates No 2-5 (a pile of irradiation FB-19) has shown:

1). The density of pites with a diameter 1-2 microns and 8-10 microns in a zone congestions of a plate No 4 (bottom) the area ~ 3×10⁻⁴ cm² is ~ 1×10⁵ cm⁻² and ~ 4×10⁴ cm⁻², accordingly. An average pite densities, representing the surrounding background in a regular manner allocated on a surface on the same surfaces, are of (1-2)×10³ cm⁻² and (1-2)×10² cm⁻² for the pites with the same diameters.

Thus, it is important to note, that on a corresponding site of the top surface of a plate No 5 number of pites in a congestion in 2-3 times below.

2). Prominent feature of a registered track is absence narrowed to a point of a stop of a track etching cone, which usually is observed for positively charged ions. Before of their stop the value of specific density of ionization and the corresponding diameter of the etched track channel, though on rather small site, are smoothly. It allows us to assume, that a track observed in given case, was formed by negatively charged nucleus particle.

Conclusion:

For the first time in the film-plates of PSSTD CR-39 and CN-85 exposed by the solar and galactic cosmic ray particles in different piles and satellite flights, were detected specific track-pite swarms, number of which equal to some tenths by one squire centimeter of the plate surface under investigation.

The origin and the nature of these track-pite swarms are considered now in according with submission expected from stopping negative charged cosmic ray Erzions [3-5].

References:

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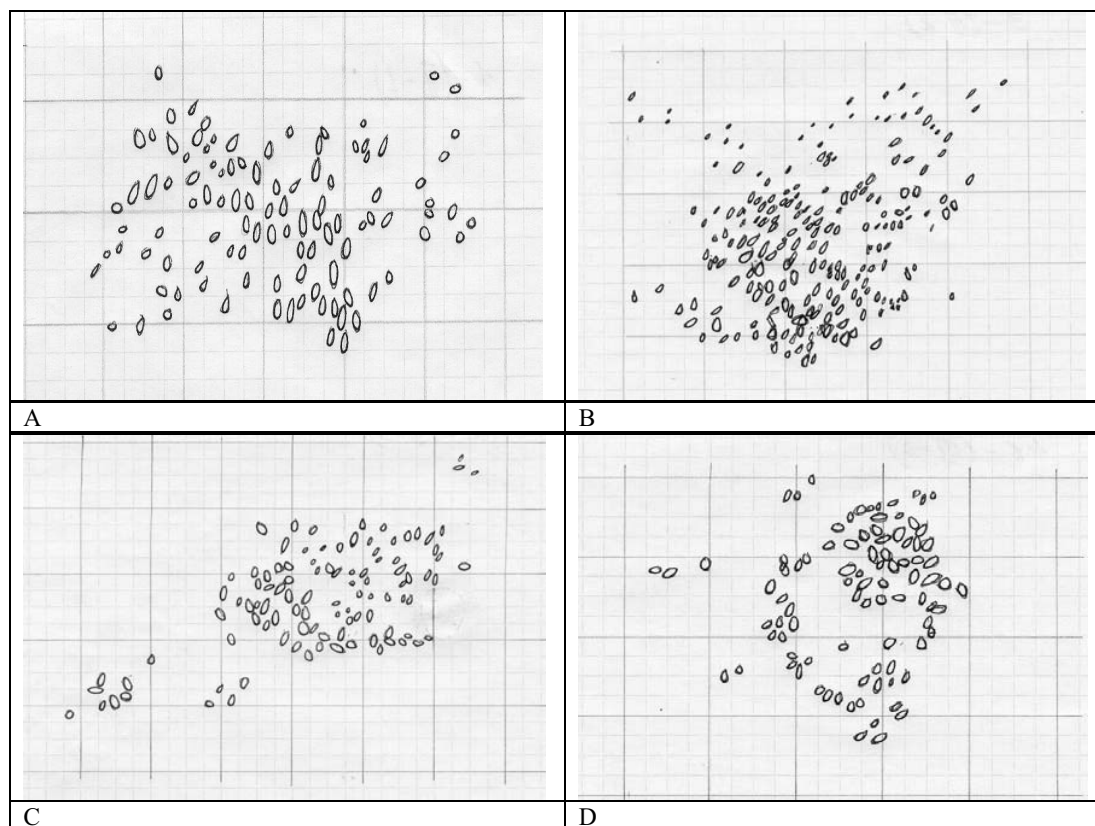


Fig.1. Four (A, B, C, D) pit-track groups, observed on the chemically etched surface of CR-39 SSTD exposed in Space by the solar and galactic cosmic rays. The log grid in minority square equal to $5 \times 5 \mu\text{m}$.

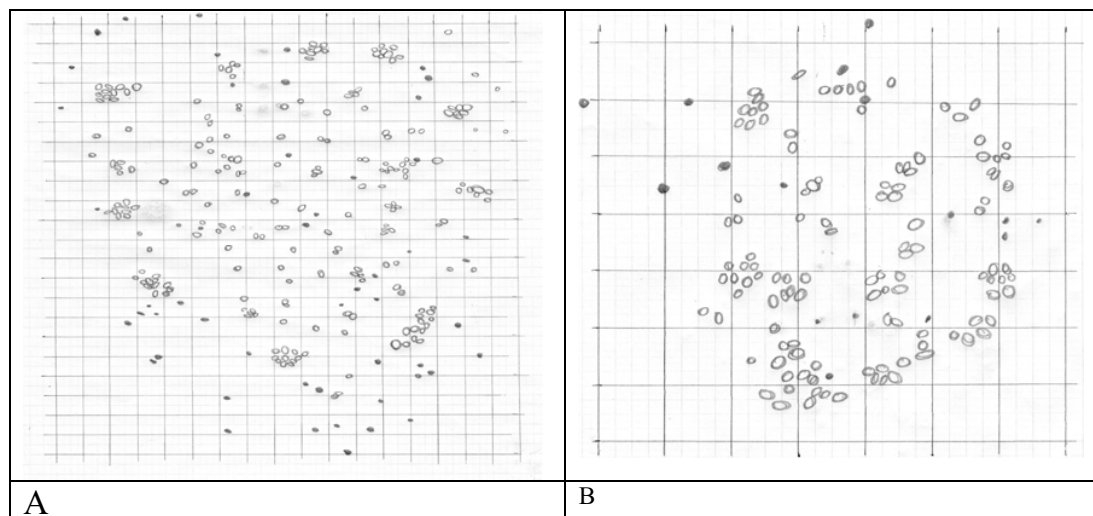


Fig.2. Two (A, B) pit-track groups, observed on the chemically etched surface of CR-39 SSTD exposed in Space by the solar and galactic cosmic rays. The log grid in minority square equal to $5 \times 5 \mu\text{m}$.

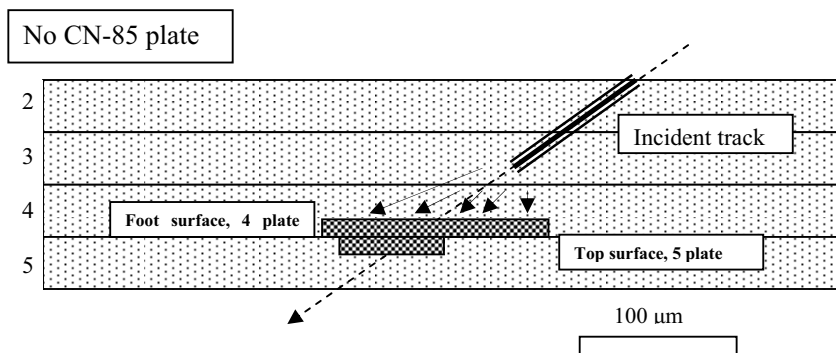


Fig. 3. Said view of the four CN-85 plates (a pile of satellite irradiation FB-19) with incident primary track of the charged particle and recorded on the two adjoined each other surfaces of SSTD pit-track groups, corresponding to particle swarm, designated as arrow.

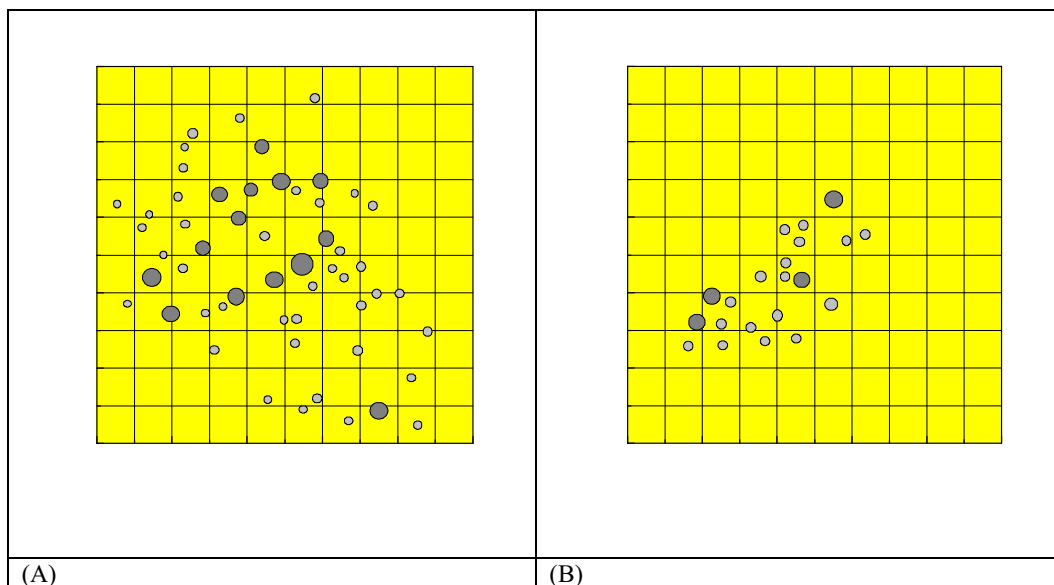


Fig. 4. Schematic presentation of the two pit-groups, discovered on the contacted each other the bottom surface of plate No 4 PSSTD CN-85 (A) and on the top surface of the plate No 5 (B). Pit diameters are 1-2 micron (1st group) and 8-10 micron (2nd group). The grid size is 20×20 micron.