
Formation processes of the ordinary chondrite parent bodies consist of the agglomeration and coalescence of the smallest particles giving a more large mineral grains aggregates, that was accompanied by their crushing in collisions with the velocities higher than those characteristic for the distinct particle sizes \( V_{\text{crit}} \). From this position it is possible to propose the relationship between the summary agglomeration-crushing effects from one side and pre-accretion exposure conditions from other side. It can be assumed because the radiation features observed in chondrite silicate minerals are influenced by their size at the moment of exposure. In this connection there probably can be seen difference of the radiation parameters for crystals constituent matrix and chondrules of the same meteorite.

The results of granulometric investigation of the Elenovka L5 chondrite are presented. Early it was obtained the pre-accretion exposure tracks storage in olivine crystals from this meteorite. Mean crystal size values and track parameters were measured in the same crystals, extracted from 1g weight sample. The chief attention in the crystal separation method was done by the practically common exclusion of a crystal-grain crushing during separation procedure. For this the starting chip sample disaggeregated have been done by means of about 100-fold recycling of the sample temperature from +100°C (boiling water) to -196°C (liquid nitrogen) on the special "cold-heat" equipment. Extracted by this manner individual olivine crystals and chondrules mounted in epoxy polishes and etched for the fossil tracks revelation. Hystograms of the size frequency distribution for the crystals under investigation are presented in Figure 1 a,b. All samples are divided by three groups with different track density intervals. It is possible to indicate the next characteristic features. 1. Absence of the crystals with size \( X \leq 50 \mu m \) in chondrules with microporphyritic and granular textures. 2. Bimodal size distribution of the olivine crystals observed in the matrix material; first group have grain size interval 20 \( \leq X \leq 100 \mu m \) and second 100 \( \leq X \leq 600 \mu m \). The last group is equivalent to the crystals from chondrules. 3. Character of the track density distribution for the crystals from chondrules and matrix is almost the same.

Observed results give possibility to assume the simultaneity of the formation (include agglomeration and crushing cases during parent body growth) and cosmic ray irradiation of the Elenovka L5 chondrite matter. At that
time, because chondrules are formed at the stage preceded to the parent body regolith stage inside these objects is not seen very fine crystal fraction which is predominant in the matrix. Obviously the formation of the last chondrite constituent have been at the more late, finished accretion stage of the parent body formation history. From this point of view the more effective crushing reworking of the chondrite matter took place at the moment of falling at the parent body surface and also in the regolith conditions.

References:

Figure 1. Size and track density distribution of the Elenovka L5 chondrite olivine crystals. 
N - total number of crystals under investigation.