SOME GENERAL CHARACTERISTICS OF THE EARLY RADIATION-THERMAL HISTORY OF CARBONACEOUS AND ORDINARY CHONDRITE MATTER ON DATA OF TRACK STUDIES. *L.L.Kashkarov, N.N.Korotkova, G.V.Kalinina.*
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Investigations of cosmic ray VH-nuclei tracks in silicate minerals of some carbonaceous (CC) (Allende CV3 [1], Kainsaz CO3 [2], Kaidun CR2 [3]) and ordinary (OC) (Saratov L4, Ochansk H4, Doroninsk H6 et al. [4-6]) chondrites suggest an uniformity of the radiation-thermal processes accompanied the formation of the primary parent bodies of these meteorites at the pre-accretion stages. The main conclusion is in the great similarity of the statistic distribution of silicate mineral grains depending on the observed track densities ( $\rho$ ) and the similarity of other track parameters [7] for both CC and OC which did not suffer the intensive exogenic treatment in regolith environments. The data given in Table and the histograms of distribution of silicate mineral grains depending on their $\rho$ for a number of chondrites are characterized as follows: 1) the rather broad ( $10^3$ -$10^7$ $cm^{-2}$ ) total range of $\rho$ values; 2) the very low values of $\rho_{min}$= ($10^3$ -$10^4$ ) $cm^{-2}$ for the most representative part of crystals that depend both on the depth of their occurrence in the preatmospheric meteorite body and on the exposure age ($T_{RAD}$); 3) the relatively low values of $\rho_{max} \lesssim 10^7$ $cm^{-2}$ which are tens-hundreds times lower than those for OCs irradiated by solar cosmic ray (SCR) VH-nuclei in the upper regolith layer; 4) the very low percentage (0-2%) of individual mineral grains with gradient $\rho$ that is at least by an order of magnitude lower than that for OCs rich in solar gases [8] irradiated by SCR VH-nuclei.

The statistical distribution of glass inclusions from Kaidun anomaleous CC [9] depending on their track parameters is of a particular interest. There are at least two track groups among them distinguished by the values: $\rho_I$=(2,7+-1,7) $10^5$ $cm^{-2}$ and $\rho_{II}$ within (3,1 - 3,7) $10^6$ $cm^{-2}$ The detailed analysis of the relation between the $\rho$ value and uranium concentration in each glass inclusion [10] leads us to the conclusion that about 10% of them retained tracks due to pre-accretion irradiation which are not connected with fission fragment tracks of extinct $^{244}Pu$.

The data stated above allow to suppose the identity as a whole of the radiation thermal history of OCs and CCs at the early pre-accretion stage of Solar system matter formation. The meteorites that did not suffer the intensive processing in the parent body regoliths retained many common irradiation features. Therefore, by analogy with the OCs [11], one of the possible source of VH-nuclei having energies $E \lesssim 100$ MeV/nucleon for the CCs can be considered the accelerated locally multi-charged SW ions from the thermalized gas of protoplanet gas-dust nebula. This was possible at the earliest stages of nebula evolution preceded the termination of gas dissipation process out of nebula region where the parent bodies of these meteorites were formed.

**References:** [1] Lavrukhina A.K., Kashkarov L.L., Korotkova N.N., et al.(1984) LPS XV,p.471. [2] Kashkarov L.L., Kalinina G.V.

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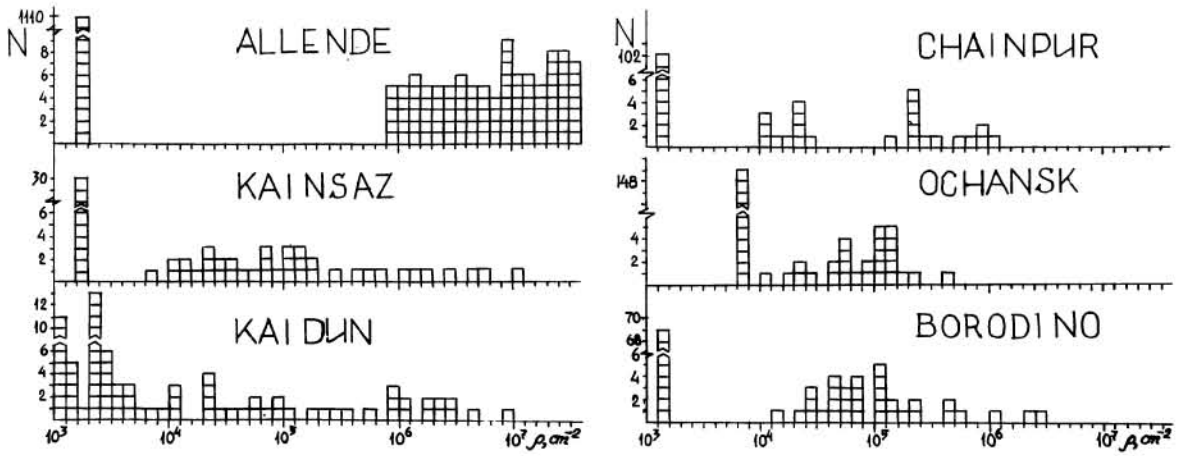
(1993) LPS XXIV, p.759. [3] Kashkarov L.L., Korotkova N.N.,et al. (1993) LPS XXIV, p.761.[4] Kashkarov L.L., Korotkova N.N., et al. (1989) Meteoritics, **24**, p.284. [5] Kashkarov L.L., Kalinina G.V. (1990) LPS XXI, p.601. [6] Kashkarov L.L., Kalinina G.V. (1991) LPS XXII, p.691. [7] Kashkarov L.L., Kalinina G.V. (1990) In Particle Tracks in Solids XV, p.72. [8] Kashkarov L.L., Genaeva L.I., et al. (1983) JGR, **88**, p. A765. [9] Kashkarov L.L., Korotkova N.N., et al. (1990) LPS XXI, p.611. [10] Kashkarov L.L., Korotkova N.N., et al. (1993) Meteoritika, **50**, p.105. [11] Kashkarov L.L. (1988) Izv. Acad. Nauk USSR, ser. phys., **52**, p.2321.

Table. Statistical track parameters in silicate minerals of carbonaceous and ordinary chondrites containing no solar gases.

| Meteorite | Number of cryst. | $\rho$min $10^4$ cm$^{-2}$ | $\rho$med $10^4$ cm$^{-2}$ | $\rho$max $10^7$ cm$^{-2}$ | $\frac{N_{irr}}{N}$ | $\frac{N_H}{N}$ | $\frac{Ngrad}{N}$ |
|---|---|---|---|---|---|---|---|
| Allende CV3 | 1187 | 1 | 1 | 6 | 0.06 | 0.06 | 0.013 |
| Kainsaz CO3 | 570 | 0.3 | 1.5 | 2 | 0.10 | 0.005 | 0.02 |
| Kaidun CR2 | 79 | 1 | 0.2-80 | 0.06-1 | 0.1-0.4 | 0.06-0.2 | n.o. |
| Chainpur LL3 | 125 | 1 | 6 | 0.1 | 0.48 | 0.04 | n.o. |
| Saratov LL4 | 164 | 1 | 1 | 0.7 | 0.20 | 0.06 | 0.007 |
| Nikolskoe L4-5 | 413 | 1 | 1 | 3 | 0.1 | 0.09 | n.o |
| Ochansk H4 | 238 | 1 | 3 | 2 | 0.20 | 0.01 | n.o. |
| Borodino H5 | 102 | 1 | 8 | 0.3 | 0.41 | 0.1 | n.o. |
| Doroninsk H5 | 226 | 1 | 1 | 1 | 0.04 | 0.01 | 0.0004 |

Notes (*)The intervals of track parameter values observed in Ol,Px and Pl are indicated. (**)Nirr-the number of crystals with $\rho \geq 10^5$ cm$^{-2}$. (***) NH-the number of crystals with $\rho \geq 10^6$ cm$^{-2}$.

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