

SOME REGULARITIES OF COSMIC-RAY EXPOSURE AGE DISTRIBUTION OF H-CHONDRITES OF DIFFERENT SHOCK CLASSES. V.A.Alexeev and N.S.Kuyunko. *V.I.Vernadsky Inst. of Geochem. and Analyt. Chem., Russian Academy of Sciences, Moscow, Russia.*

Distribution of the cosmic-ray exposure ages of weakly shocked H-chondrites (S1,S2,S3 shock stages according to classification of Stöffler et al. [1] and a,b,c shock facies according to classification of Dodd and Jarosewich [2] assumes the formation of H-chondrites 6-7 Myr ago in event without strong shock pressure.

Distribution analysis of cosmic-ray exposure ages (t) and radiogenic U,Th-He ages (T) of H-chondrites shows that portion of meteorites with low T is bigger among meteorites with low t . So, we have found for age distributions of H-chondrite falls that $34 \pm 6\%$ of meteorites with $t < 12$ Myr have $T < 3$ Gyr (35 out of 102) whereas only $21 \pm 5\%$ (16 out of 76) of meteorites with $t \geq 12$ Myr have $T < 3$ Gyr (see Fig.1). This tendency we can see also for non-Antarctic and Antarctic H-chondrite finds, and, to a lesser extent, for distributions of cosmic-ray exposure ages vs. K-Ar ages (see Table).

Such difference could result from different thermal history of meteorites of different ages. There is well known peak near 6-7 My in the distribution of the cosmic-ray exposure ages of H-chondrites. Meteorites of this peak could experience an intense shock pressure with high temperature heating at their formation out of parent body and, in consequence, these meteorites could lose part of radiogenic gases (He-4 in the first place).

For investigation of this question we studied the cosmic-ray exposure age distribution of H-chondrites of different shock classes. We used classifications of Stöffler et al. [1] and Dodd and Jarosewich [2]. All H-chondrites were divided on two groups. First group consists of H-chondrites of S1,S2 and S3 shock stages (according to [1]) and of a, b and c shock facies (according to [2]). Meteorites of this group experienced the shock pressure less or about 20 GPa. Second group contains the meteorites experienced more strong shock pressure. We used here the exposure ages calculated in our early studies [3]. The distribution of exposure ages of the first meteorite group is shown on Fig.2 in comparison with that of all H-chondrites. We can see identical distributions: (1) the same position on the peaks, and (2) about 65% of H-chondrites have exposure age of $t < 12$ Myr in both cases. This similarity assumes the formation of the H-chondrites of peak in event without strong shock pressure. Shock pressure less or about 20 GPa can condition the heating of the meteorite up to temperatures of $\sim 150^\circ\text{C}$ [1]. Such low temperature cannot stipulated essential losses of rare gases. Apparently, above mentioned small losses of radiogenic He-4 in the some meteorites with low cosmic-ray exposure ages could be induced rather by solar radiation heating at small perihelions.

There are few meteorites of second group (strong shocked) to do some conclusions for this group.

Table. Portion of H-chondrites (%) with radiogenic ages of $T < 3$ Gyr for different intervals of cosmic-ray exposure ages of t .

Radiogenic age	Cosmic-ray exposure age, Myr	Falls	Non-Antarctic finds	Antarctic finds
U,Th-He	$t < 12$	34 ± 6	56 ± 10	36 ± 8
	$t \geq 12$	21 ± 5	37 ± 11	9 ± 5
K-Ar	$t < 12$	7 ± 3	17 ± 5	12 ± 4
	$t \geq 12$	11 ± 4	7 ± 5	3 ± 3

References:

- [1] Stöffler D., Keil K., Scott E.R.D., GCA, 1991, v. 55, 3845.
 [2] Dodd R.T., Jarosewich E., EPSL, 1979, v.44, 335.
 [3] Alexeev V.A. LPS XXIII, 1992, 15; XXIV, 1993, 11.

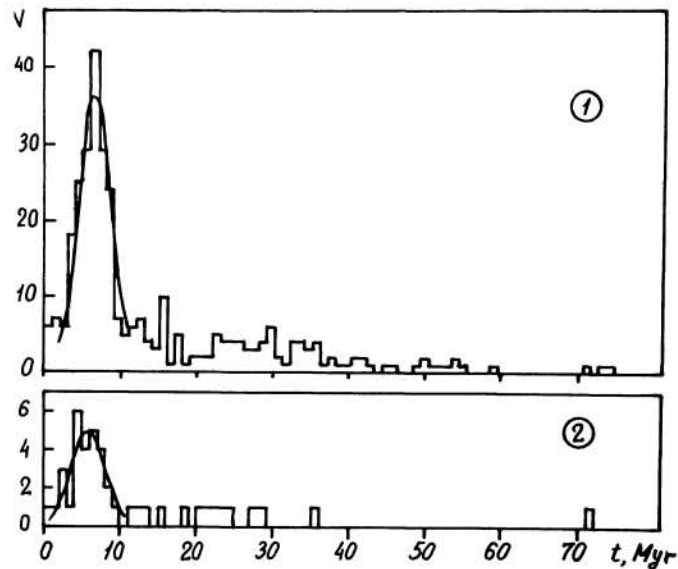
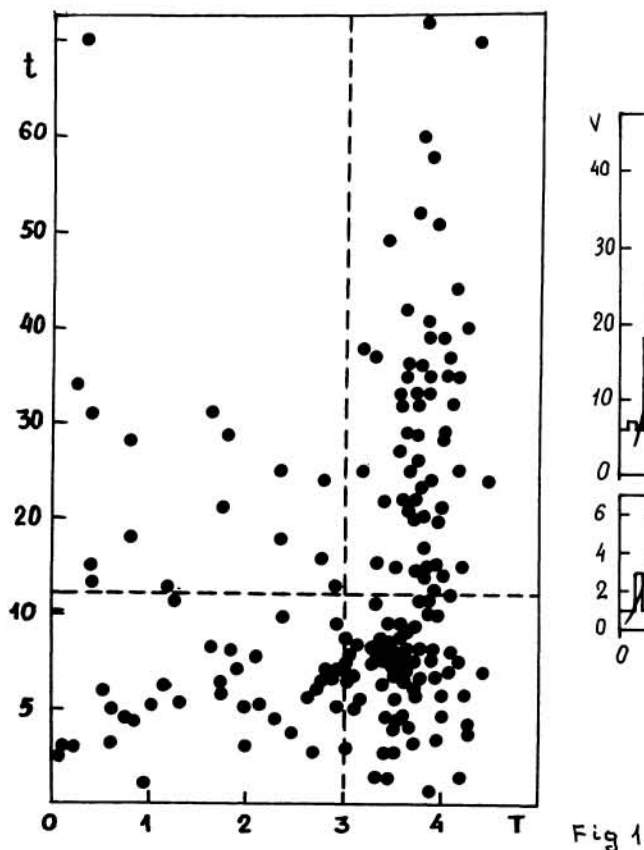


Fig 2

- Fig.1 Distribution of cosmic-ray exposure ages (t , Myr) vs. the radiogenic U,Th-He ages (T , Gyr) of H-chondrite falls.
 Fig.2 Distributions of cosmic-ray exposure ages of H-chondrites; 1 - all H-chondrites (318); 2 - weakly shocked H-chondrites (S1, S2, S3 shock stages [1] and a, b, c shock facies [2]).