

ON CALCULATION OF COSMIC-RAY EXPOSURE AGES OF METEORITES.  
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For exclusion the systematic error in calculation of cosmic-ray exposure ages of meteorites the values of cosmogenic Ne-21c and (Ne-22/Ne-21)c ratio calculated out of noble gas data obtained before 1967 must be multiplied by 1.08 and 1.038 respectively.

Study of the distributions of cosmic-ray exposure ages can give some information on conditions of these cosmic bodies formation. For L- and H-chondrites we see as a whole exponential decrease of the number of meteorites with increase of the exposure age (with  $\tau \approx 30\text{My}$  [1]). H-chondrites show also clear peak in the region of  $\approx 7\text{My}$ . At the present time the attempts to find out the "thin structure" in exposure age distributions of H- and L-chondrites are undertaken for discovery of possible clusters resulted from simultaneous origin of the meteorite groups [2,3]. In this attempts it is necessary to take into consideration the uncertainties of age values which can leads to the incorrect conclusions.

Now exposure ages are usually calculated with production rates of Eugster [4] on contents of cosmogenic He-3, Ne-21 and Ar-38 (with small correction for Ar-38 [5,6]). However, many noble gas measurements were carried out more than 25 year ago and content the systematic error [7]. It was found the systematical decrease of the cosmogenic (Ne-22/Ne-21)c ratios on an average by  $3.8 \pm 0.8\%$  for analyses published in or before 1967 in comparison with those for analyses after 1967 [8]. This effect must be born in mind in calculations of the exposure ages.

For determination the possible systematic deviation in contents of cosmogenic Ne-21 calculated on data published before 1967 we select those H chondrites which were analysed both before and after 1967. For each such meteorite the average value of cosmogenic Ne-21 was calculated:  $(\text{Ne-21})_{\text{av}} = \sum (\text{Ne-21})_i / n$ , where  $(\text{Ne-21})_i$  are contents of cosmogenic Ne-21 for the different years of measurements in the meteorite and  $n$  is the number of Ne-21 measurements for given meteorite. Then the relative contents of cosmogenic Ne-21 were calculated in this meteorite:  $R_i = (\text{Ne-21})_i / (\text{Ne-21})_{\text{av}}$ . Such procedure was made for all selected meteorites and histograms were constructed for  $R_i$  values for analyses both before and after 1967 (Fig 1). The obtained distributions are close to normal ones and for every histogram the Gaussian curve was calculated by the method of successive approximations. The difference between positions of the maxima is  $8 \pm 2\%$ . Thus if we want for more statistical validity of conclusions to use the noble gas data published in or before 1967 we must calculated contents of cosmogenic Ne-21 multiply by 1.08 and calculated cosmogenic Ne-22/Ne-21 ratios multiply by 1.038. This will allow to avoid the discussed above systematic deviations.

We made this procedure for H-chondrites falls and finds with exposure ages of  $t \leq 12\text{My}$  (the region of peak). The obtained results (Fig.2) showed a shift of peak after corrections in the direction of higher ages; the peak for corrected ages became narrower. Apparently presence of different uncertainties at determination of the exposure ages stipulates the resolving power on the exposure age scale of 20-30%, close to the width of H-chondrite peak.

## REFERENCES

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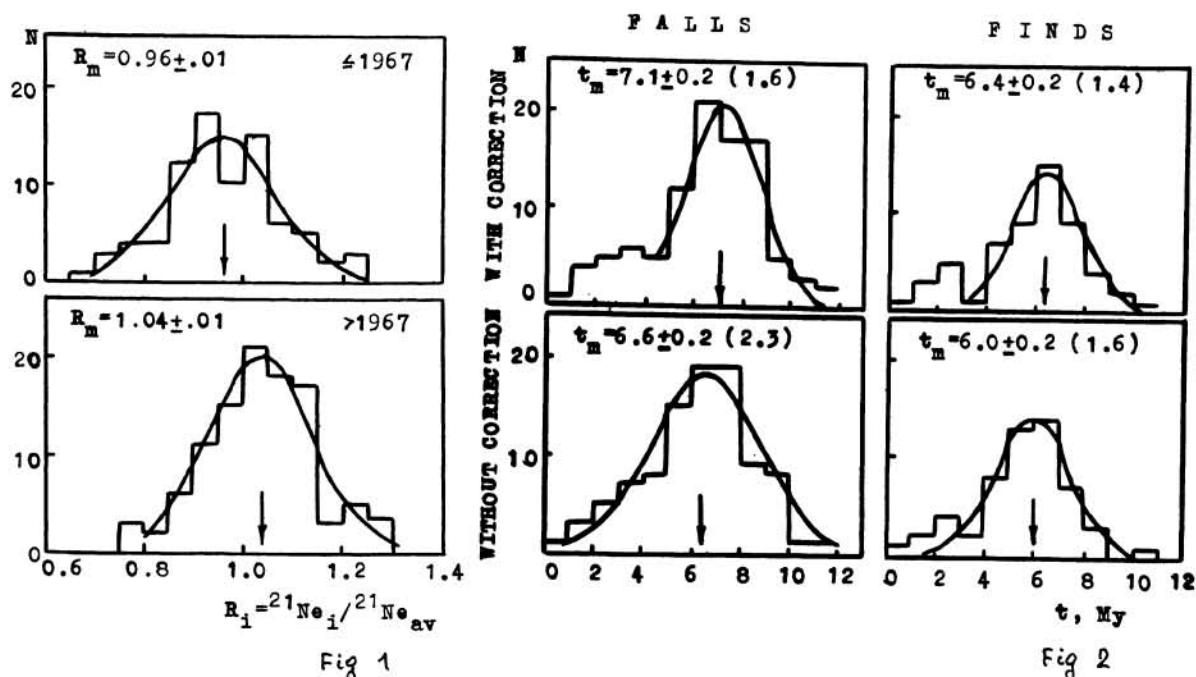


Fig.1. Distributions of cosmogenic  $(\text{Ne-21})_i / (\text{Ne-21})_{av}$  ratios of H-chondrites which were investigated on noble gas content both before and after 1967. Arrows show the maximum positions of Gaussian curves ( $R_m$ ).

Fig.2. Distributions of exposure ages ( $t$ ) of H-chondrites (falls and finds) with  $t < 12\text{My}$ . Above - the ages were calculated with corrections of cosmogenic Ne-21 contents and Ne-22/Ne-21 ratios of meteorites measured before 1967; below - without corrections. The errors are standard deviation of average value (first number) and parameter of  $\sigma$  in Gaussian equation (the number in parenthesis).