PETROGRAPHY, MORPHOLOGY AND DISTRIBUTION OF SIZES OF THE CHONDRULES FROM THE KAINSAZ CARBONACEOUS CHONDRITE (C3O).

G.V.Baryshnikova, Yu.I.Stakheev, G.G.Rukhman, A.K.Lavrukhina.
V.I.Vernadsky Institute of Geochemistry & Analytical Chemistry, USSR Acad. Sci., Moscow, USSR.

The Kainsaz chondrite belongs to the least altered carbonaceous chondrites of the Ornans-type (C3O). It exhibits a distinct chondritic structure (Fig.1.) and highly heterogeneous compositions of the major minerals - olivine ($\overline{Fa}$ = 11.8 mol.%, PMD = 70) and low-Ca clinopyroxene ($\overline{Fs}$ = 3.2 mol.%, PMD = 64) (1). The meteorite contains numerous chondrules and inclusions set in fine-grained carbonaceous matrix. A petrographic, morphologic and granulometric investigation of 540 chondrules in thin sections has been carried out. The morphology of chondrules from the ground sample of the meteorite was also determined.

The examined chondrules are classified according to their mineralogy, structure and size. As with ordinary chondrites (2) the chondrules from Kainsaz fall into two major categories - lithic and fluid drop, the former being by far more abundant. The volume ratios as determined in thin sections average 61% lithic and 39% fluid drop chondrules, to agree with the literature data (3).

Although the fluid drop chondrules from Kainsaz show essentially the same structural types as are found in ordinary chondrites (2), the majority of microporphyritic or holocrystalline olivine-pyroxene chondrules have abundant amounts of tiny nickel-iron or troilite spherules. The lithic chondrules in Kainsaz exhibit a greater variation in structure than chondrules of ordinary chondrites while granular olivine-pyroxene chondrules contain in addition inclusions of opaque minerals (Fig.1.). The granulometric analyses performed separately for the lithic and fluid drop chondrules in thin sections (Fig.2.)yielded the following results: the graphic mean grain size, M_z, is 0.372 mm (fluid drop) and 0.275 mm (lithic); the graphic standart deviation, σ_i, is 0.733 mm(fluid drop) and 0.699 (lithic). The grain size frequence data for all chondrules of Kainsaz chondrite

PETROGRAPHY, MORPHOLOGY AND DISTRIBUTION

Baryshnikova G.V. et al.

show that: 1. on average, the chondrules from Kainsaz are smaller compared to ordinary chondrites (4); 2. the fluid drop chondrules are on the average bigger than lithic; 3. the monodispersion of lithic chondrules is more pronounsed than of the fluid drop ones. Both show a greater dispersion relative to the chondrules from ordinary chondrites (Fig.2.).

The abundance of Fe-Ni inclusions makes one suggest that the substance of the Kainsaz chondrules must have formed under more reducing conditions than the chondrules from ordinary chondrites.

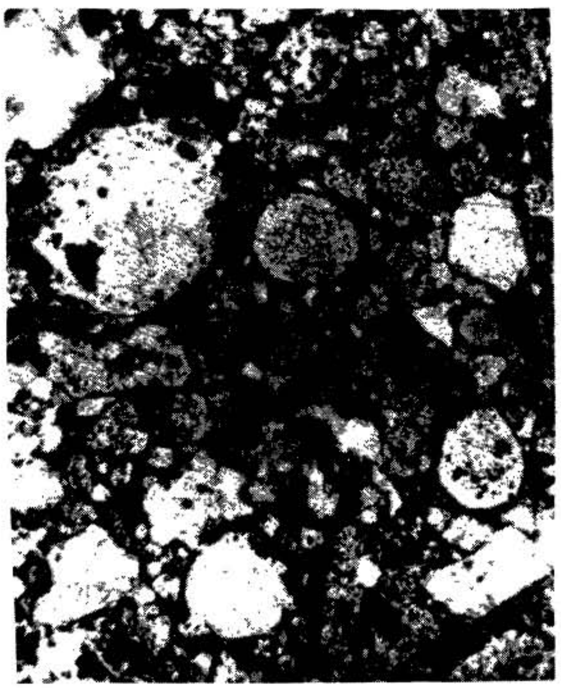

Fig.1. The general view of the Kainsaz chondrite in thin section. The structure is clearly chondritic. Transmitted light, no analyser. Scale bar 0.2 mm.

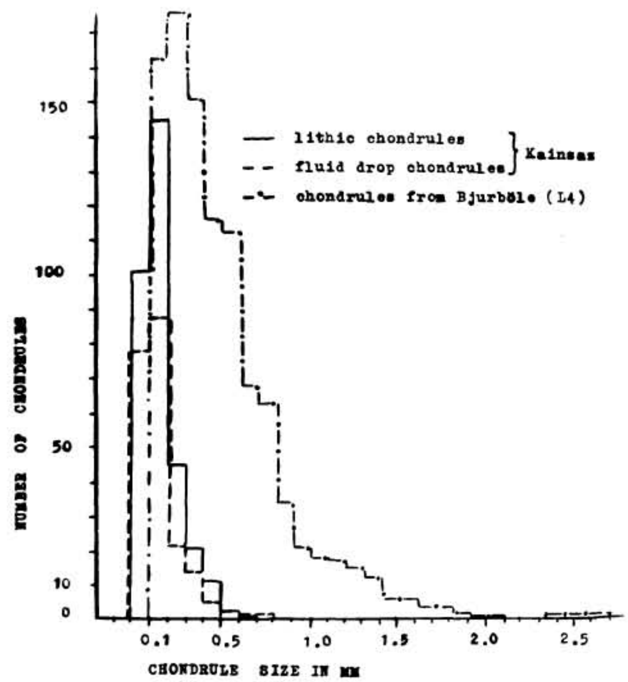

Fig.2. Histograms to show the distribution of sizes of chondrules in Kainsaz and Bjurböle (L4) chondrites.

References: (1) Van Schmus W.R.(1969) In: Meteorite Research, P.M.Millman ed., Dortrecht, Holland, p 480. (2) Baryshnikova G.V., Lavrukhina A.K. (1982) Geochimia, N 4, p 490. (3). King T.V.V., King E.A.(1979) Meteoritics, 13, p 47. (4) Stakheev Yu.I. et al.(1973) Meteoritika, 32, p 103.