

L3 chondrite including unique chondrules

Keizo Yanai[1]

[1] Dept. Civil and Environ., Faculty of Engin., Iwate Univ.

This ordinary chondrite is unequilibrated one belong to L3 for its texture, chemical, minerals and mineral compositions. The chondrite consists of many chondrules, chondrule fragments, olivine and pyroxene with their fragments, Fe-Ni metals, troilite and matrices. Olivine compositions range from Fo0.6 to Fo30.7 and orthopyroxenes range Fs1.4 to Fs24.3 with pigeonite(En87.5Fs7.2Wo5.3). The chondrules show various types such as granular, porphyritic, poikilitic, crystalline and radial pyroxene one. An unique chondrule is identified in their chondrules for its unique texture, minerals and mineral compositions, and it is distinguished clearly from other chondrules.

An unique chondrule is recognized in the L3 ordinary chondrite. This ordinary chondrite contains many types of chondrule in which one of chondrule is conspicuous for its unique texture from other chondrules. The chondrule consists mostly of an almost complete euhedral olivine grains with some drop-shaped Fe-Ni metals in clear glass groundmass rimmed by orthopyroxenes. The glass groundmass of the chondrule is completely clear glass showing a transparent in core and pale brown color in mantle to rim. The compositions of glass show typical zoning of Si, Al, Ca, Na, K, Fe and Mg. Author reports some results of petrographical and chemical study on this unique chondrule.

This unique chondrule is nearly round to square shape, ~2 mm in diameter, surrounded by thin rim of orthopyroxenes with opaque-dark material. Olivine occurs as two types; one is prism-like shape of euhedral enriched in core, and other is granular to porphyritic occurrences occurs in mantle to rim. Olivine compositions of the both occurrences are same and complete uniform composition of Fo99.5Fa0.5(forsterite). Orthopyroxenes of the rim are also almost uniform of compositions such as En97-99Fs0.5-2Wo0.5-1.5(enstatite). Compositions of olivine and pyroxene are corresponded to those of enstatite chondrite. Those compositions are quite differ from those of other chondrules, and also differ from those of olivine and pyroxene grains of matrix in host. Glass compositions of the chondrule groundmass are also unique showing of typical compositional zoning. Al, Mg and Ca are enriched at the core, but Si, Fe, Na and K are poor. CaO is over 15% in the core, but decreased to 9% at the mantle-rim. Other hand, Na₂O is near 0% in the core, but increased to 7% at the mantle-rim.

In this chondrule, phenocrysts(olivine and orthopyroxene) are characterized by the quite uniform of their compositions, but those of glass groundmass show remarkable compositional variation(chemical zoning), and they are different from those of host rock. Such features of this chondrule might be resemble as one of the unique occurrences in chondritic meteorites.