

**REGOLITH BRECCIA CONSISTING OF H AND LL CHONDRITE MIXTURE**

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Antarctic meteorite Yamato-8424(Y-8424) is a regolith breccia that is homogenized mixture of H and LL chondrite components. The breccia consists mainly of a fine-grained material with mineral fragments of olivine, pyroxene and Fe-Ni metal with traces of plagioclase.

Y-8424 is a small irregular shaped stone(mostly complete) weighing 9 grams[1] and it is covered with a dull-black fusion crust. The surface of the stone shows a dark brown to brown to do weathering effect, however the interior(sawing surface) is very fresh with relatively large and very fresh Fe-Ni metal grains in dark grey fine material.

In the thin section (Fig. 1), Y-8424 shows typical negolith breccia consisting mainly of fine-grained matrix and less amount of mineral fragments. The mineral fragments are olivines, pyroxenes and Fe-Ni metal ranging 0.2-0.4 mm, excepting 1 mm Fe-Ni metal grain (center of bottom in Fig. 1). The matrix is fine grains under 50 $\mu$ m, consisting of olivines, pyroxenes, troilite, Fe-Ni metal and traces of plagioclase within very fine recrystallized. Most troilites distributed as under 30 $\mu$ m grains along the grain boundaries in the whole section. Some relatively large fragments may be traced as parts of chondrules. Therefore it indicates that the specimen is originally chondrite.

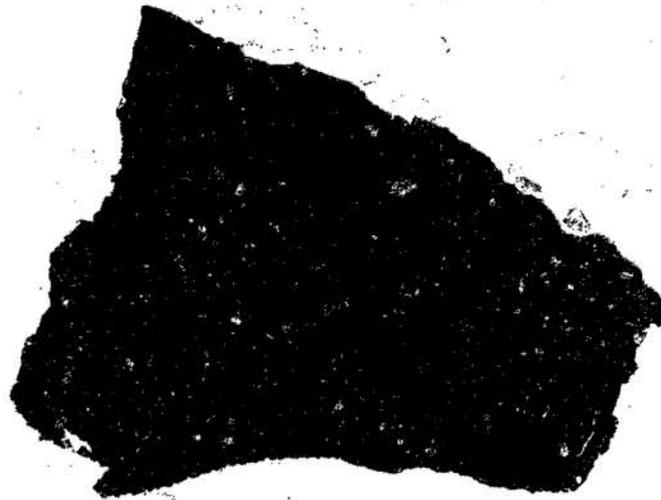


Figure 1. Photomicrograph of the thin section of Yamato-8424, regolith breccia of H and LL chondrite mixture. Field view 6.5 mm wide.

The result of the EPMA analyses of constituent minerals show an unusual features such as Fig. 2. Olivines and low-Ca pyroxenes in both mineral fragments and fine grains in matrix, appear as the bimodal frequency patterns in their compositions. Olivines are recognized three groups for their compositions such as an average composition Fa17.5, Fa23.0 and

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Fa28.7. Especially two remarkable peaks of them are conspicuous and they are corresponded to those of H and LL chondrite groups. Low-Ca pyroxenes are comprised largely two compositional groups such as an average composition Fs15.8 and Fs22.8, and they are also corresponded to H chondrite group and L-LL groups. Both olivines and pyroxenes drove from at least two chondrite groups, and they distribute uniformly in the whole section as mixture.

The texture and unusual compositional patterns indicate that Y-8424 is the regolith breccia and it is the mixture of the different chondritic materials. The mixing of the materials should be carried out on the parent bodies before the breaking of them. It seems that the Yamato-8424 regolith breccia had been formed by the mixing on the surface of the chondrite parent body(bodies) by the intense collisions of the H or L or LL chondrite bodies, during the early stage of the solar system.

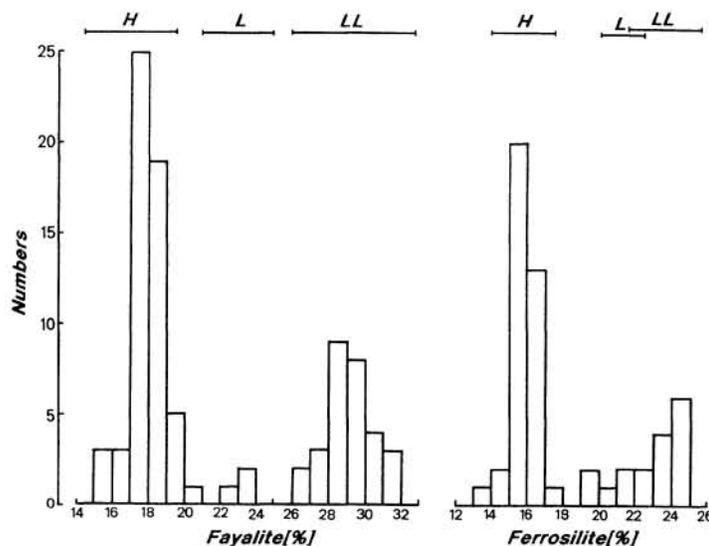


Figure 2. Frequencies of Fa and Fs compositions, correspond to H, L and LL chondrites.

Reference: [1] Yanai, K. and Kojima, H. (1987): Photographic Catalog of the Antarctic Meteorites. p298, NIPR Tokyo.