OLIVINE FASSAITE BASALT: AN UNUSUAL ACHONDRITE FROM ANTARCTICA; K. Yanai, Department of Antarctic Meteorites, National Institute of Polar Research, 9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173 Japan

One of Asuka meteorites, found on the bare ice near the Sör Rondane Mountains (71°-73°S, 21°-29°E) in the recent, have been identified preliminary as an unique type of achondrite which consists mainly of fassaite, plagioclase and olivine, with accessory spinel. This specimen is 11 grams in weight, rounded stone almost completely covered with dull black fusion crust. Pale green, relatively coarse olivine crystals are seen on the exposed interior surface. The photograph of the section (Fig.1) shows an unbrecciated and typical ophitic (doleritic) texture with euhedral plagioclase, intergranular fassaite and relatively coarse olivine, and opaques and spinel. From its texture, it is clear that this meteorite originated from igneous activity on the surface or near surface of its parent body, however its parent body has not yet been identified.

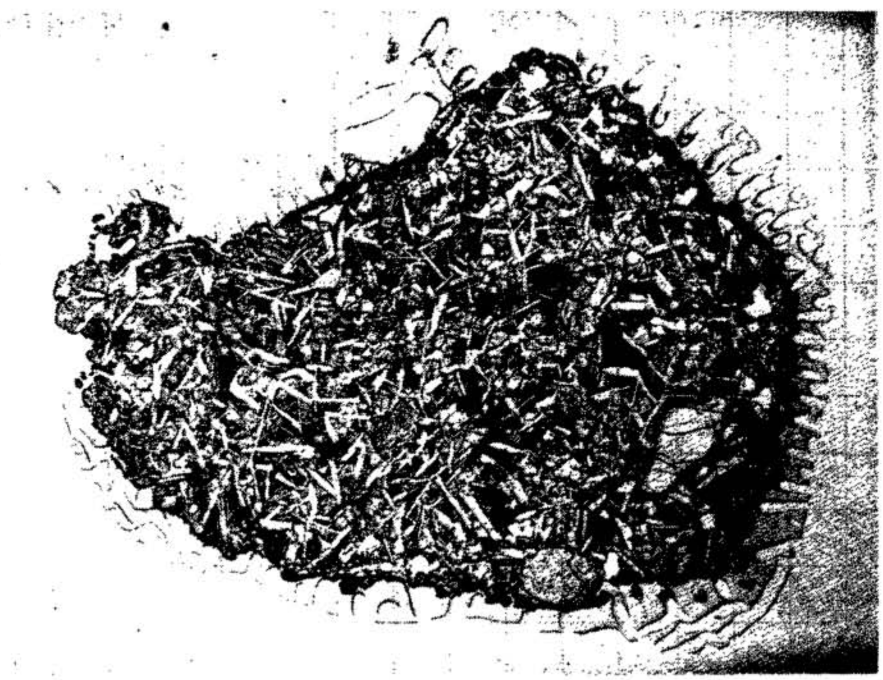

Fig.1. Textural relationship in the new found Antarctic meteorite. Typical ophitic (doleritic) texture of plagioclase, fassaite, and relatively coarse olivine. Open nicol, field view 13 mm wide.

Pyroxene: Pyroxene (fassaite) is the most abundant mineral and is relatively strongly pleochroic, from near colorless in the core to brown in the rim in thin section. It is high in CaO (over 22%) and Al_2O_3(3.5-9.9%). Most pyroxenes are chemically homogeneous in CaO, but they show zoning from Mg-rich cores to Fe-rich rims, which corresponds to their pleochroic features. As Fig.2 very few pyroxenes in this meteorite project on to the pyroxene quadrilateral in which all known pyroxenes in lunar basalts plot. The pyroxenes have remaskably high FeO/MnO ratio (Fig.3), in which several grains are within the range of average lunar pyroxenes, but most of them are clearly different from pyroxenes of lunar and basaltic achondrites.

Olivine: Olivine shows very wide compositional range of $Fo_{2.8-90}$ and are zoned over a range of composition Fo_{58-85}, with Fe-rich rims and extremely Mg-rich cores. Most olivines analyze in the range Fo_{55-73} and Fo_{84-90}; however some are very Fe-rich, $Fo_{2.8}$ (see Fig.2).

Plagioclase: Plagioclase is remarkably homogeneous and virtually, pure-Ca, over An_{99}. It is more calcic than plagioclase found in all known achondrites (except angrites), and in lunar basalts. No evidence of zoning and maskelynitization were found.

Bulk chemistry and Oxygen isotope: Bulk composition gives 37%SiO_2 1%TiO_2, 10%Al_2O_3, 23%FeO, 15%MgO, 13%CaO, and under 0.1% Na_2O and K_2O. The results of the oxygen isotopic analysis are not similar to previous analyses of lunar rocks (R. Clayton, personal communication 1989).

Conclusion: The meteorite is an unusual achondrite and texturally similar to LEW 87051 classified as an angrite[1-2], but texturally and chemically distinct from the Angra dos Ress[3], LEW 86010 and LEW 87051 angrite[4-5].

Reference: [1] Ant. Met. News(1989). **12**(1), 15. [2] Warren P.H. and Kallemeyn G.W.(1990). LPSC XXI, 1295-1296. [3] Prinz M. et al.(1977). Earth and Planet. Sci. letter **35**, 317-330. [4] Ant. Met. News(1987). **10**(2). [5] Kallemeyn G.W. and Warren P.H. (1989). LPSC XX, 496-497.

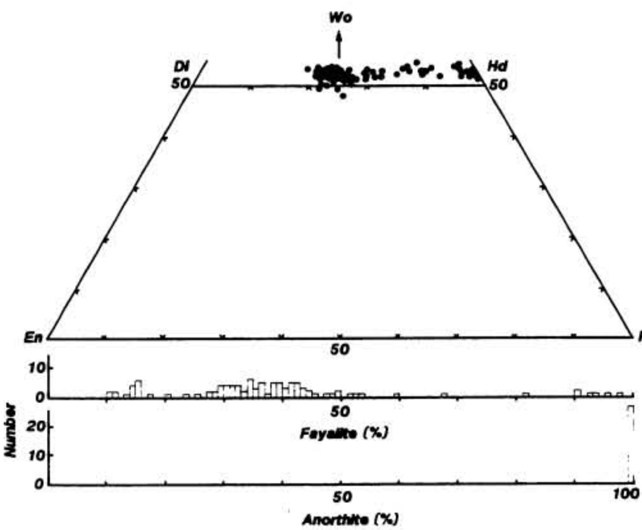

Fig.2. Composition of pyroxene in the three-component diagram Wo-En-Fs (molecular percent). Also shown are the compositions of coexisting olivine and plagioclase.

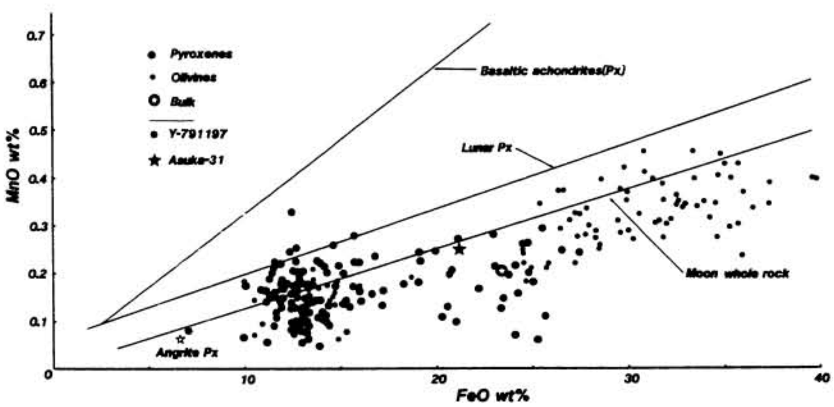

Fig.3. MnO-FeO values of pyroxenes and olivines in unusual achondrite compared with those of lunar and basaltic achondrites, and lunar whole rock analyses.