LEW 85300,02,03 POLYMICT EUCRITES CONSORTIUM - II: BRECCIA CLASTS, CM INCLUSION, GLASSY MATRIX AND ASSEMBLY HISTORY. J. Kozul and R.H. Hewins. Rutgers University, Dept. Geological Sci., New Brunswick, NJ 08903.

The Lewis Cliffs 85300-03 Consortium was set up to perform detailed microprobe, geochemical and isotopic analyses in part to gain information of polymict eucrite assembly history. This breccia contains igneous clasts (1), breccia clasts, CM chondrite and mineral fragments enclosed in a dark glass matrix. Preliminary microprobe and optical data are reported here.

Breccia Clasts: Though all the clasts in the LEW polymict eucrite have been brecciated, 7 clasts differ from igneous clasts in that they appear to have been part of earlier breccias. There are 2 types of breccia clasts: unrecrystallized and recrystallized, readily distinguishable texturally, Fig.1a&b.

Unrecrystallized Breccia Clasts: (LEW PTS, 85302,20 and 85300,39). These are clasts of clastic breccias containing angular and rounded mineral fragments and igneous clasts (< 2 mm) in a fine-grained eucritic matrix. The ,39 clast also contains a chondritic fragment (1.5 mm). Both clasts contain less equilibrated pyroxene than the igneous clasts (1), Fig. 2a., and plagioclase An80-100.

Recrystallized Breccia Clasts: (LEW 85302, 44; 85303 ,59 ,60 ,65 ,75) These clasts contain mineral fragments and clasts of various textures (ophitic, sub-ophitic, fasciculate (2)) enclosed in a fine-grained, polygonal groundmass of pyroxene and plagioclase. Pyroxene compositions are eucritic, Fig. 2b, and plagioclase is An85-100. One of these clasts (,75) appears foliated, Fig. 1b. The dark regions that lie along one plane are areas of very fine-grained recrystallized material. PTS ,59 and ,60 may be part of the same breccia clast as they both contain similarly-shaped igneous fragments; a dark fasciculate (2) region and a sub-ophitic area, both have similar recrystallized matrix and similar shapes, roughly retangular, and sizes (approx. 7 x 5 mm). Recrystallized breccia clasts resemble the eucritic xenolith found in Malvern by (3).

Glassy Matrix: The meteorite dark glass matrix contains vugs and small (< 1.0 mm) round and angular pieces of lithic clasts, igneous and recrystallized, and mineral grain fragments, pristine, recrystallized and remelted. The ubiquitous nature of this black glass and the fact that all other clast types are enclosed in it, indicates that it records the last significant impact on the HED parent that the LEW polymict eucrite underwent. Glass of pyroxene composition is found in the dark-glass matrix, Fig. 3. Lithic clasts in the glass matrix are eucritic and minerals fragments are eucritic. One diogenitic orthopyroxene fragment was found.

The Lew 20 breccia clast has large cracks filled with a black glass similar in composition to the dark glassy matrix of the entire eucrite, Fig. 3. This suggests that dark glassy matrix intruded this clast. The ,39 clast contains many patches of dark glass within its non-glassy matrix and a few plagioclase grains have dark glass inclusions suggesting that the matrix and minerals of unrecrystallized breccia clasts melt `in situ' to form dark glassy matrix. This clast has large cracks that crosscut both the breccia and glass patches. Dark glassy areas inside non-glass breccias are common in polymict breccias (3,4) and it may be that the glass in this clast predates the meteorite glassy matrix.

CM Fragment: One PTS, LEW 85300,40, is a piece of CM chondrite. Chondrule olivine compositions are Fo51-99 and pyroxenes range from diopside to Fs40Wo10, Fig. 4. CM xenoliths are common in polymict breccias (5) and if not devolatilized indicate compaction and lithification of the regolith occurred at < 200oC (5). This suggests that the dark glass matrix was not formed by `in situ' melting. Detailed analyses of this clast may determine the extent of mixing between eucrite components and chondritic components in the LEW polymict eucrite.

Assembly History: Four of the recrystallized breccia clasts are enclosed or bordered by dark glassy matrix. One of them (,60) and one igneous clast (,72) are bordered by the glass-free matrix of uncrystallized breccia clasts which grades into dark glassy matrix. The dark glass matrix

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appears to intrude into the non-glassy matrix along grain bouldaries and mineral fractures. The textural relationships of the LEW clasts and matrix suggests the following assembly history: 1) crystallization of igneous clasts; 2) brecciation of igneous clasts and formation of the now recrystallized breccia clasts; 3) brecciation and mixing of recrystallized breccia clasts and igneous clasts into non-glass matrix; 4) intrusion of dark glass or impact melting of non-glassy matrix.

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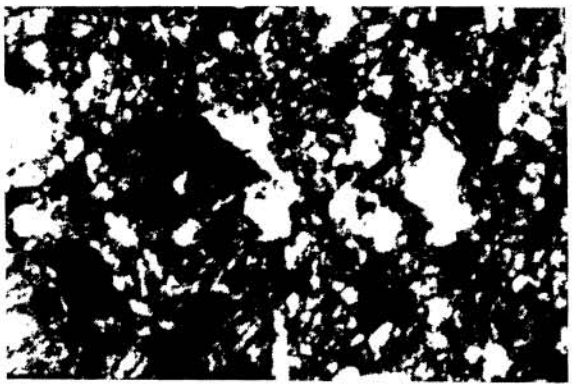

Fig. 1a. Unrecrystallized breccia; length = 2.3 mm.

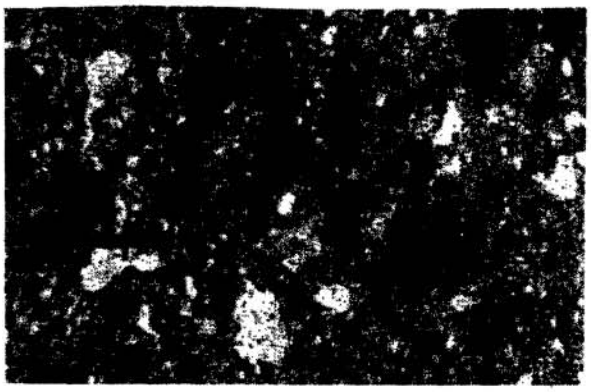

Fig. 1b. Recrystallized breccia; length = 2.5 mm.

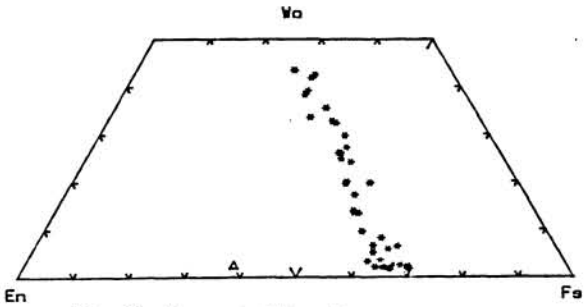

Fig. 2b. Recrystallized breccia pyroxene.

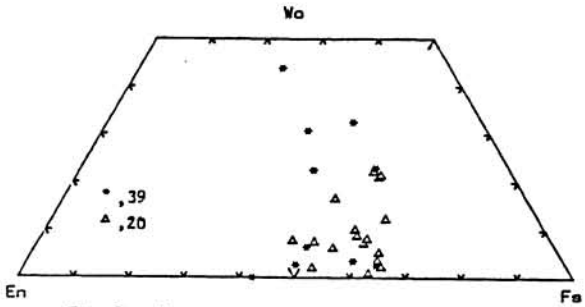

Fig. 2a. Unrecrystallized breccia pyroxene.

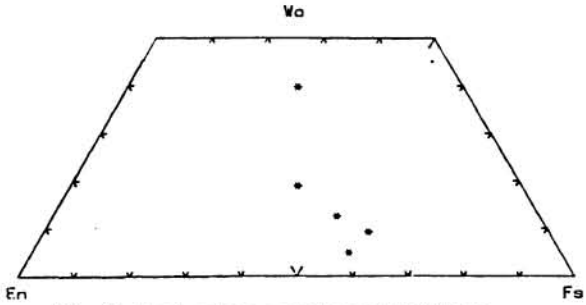

Fig. 3. Dark glass matrix compositions.

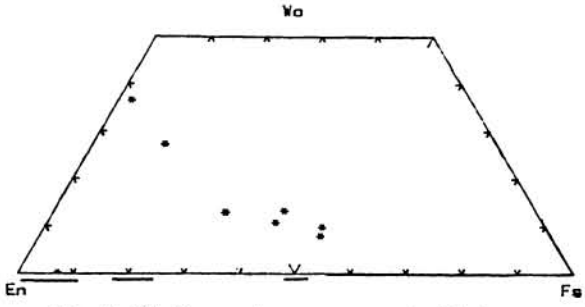

Fig. 4. CM fragment pyroxene and olivine.