tigation selected major element distributions were determined for Orgueil and Murchison matrices (Brownlee *et al.*, 1987). The observed distributions were similar to some chondritic IDP's but quite distinct from others. In order to collect a more comprehensive set of data from thin-sections, an AEM equipped with a digital beam control is being utilized. This has the capability of performing automated analyses on a two dimensional grid across an entire thin-section. Parameters that can be varied include incident probe size, x-ray acquisition time (at each data point), and the distance between data points. A typical acquisition routine may acquire 600-700 spectra from a single thin-section over an 8-10 hour period. Similar data from several thin-sections could provide several thousand quantitative analyses from a single IDP.

The nanoprobe capabilities of modern AEM's provide a means of characterizing the finest grained components of IDP's and CC's in thin-section. Most electron microscopic studies of meteoritic materials have focused on the coarse grained (> 0.1 μm) matrix components. In the case of some chondritic IDP's this is a significant constraint because most of their masses are contained in polycrystalline assemblages where the mean grain size is < 0.1 μm. Within these fine grained matrices are petrographic features that have not been observed among the coarse grained components. These include surface coatings on grains, refractory inclusions within crystals, and evidence of reactions along grain boundaries. Petrographic features like these are potentially important because they may enable reconstruction of chronological events important during the formation of IDP's.

Bradley, J.P., 1987. Submitted to *Geochim. Cosmochim. Actra.*
Bradley, J.P. and D.E. Brownlee, 1986. *Science* **231**, 1542-1544.
Brownlee, D.E., M.M. Wheelock, S. Temple, J.P. Bradley, and J. Kissel, 1987. *Lunar Planet. Sci. XVII*, 133-134.
Sandford, S. and R.M. Walker, 1985. *Astrophys. J.* **291**, 838-851.

PRIMITIVE CARBONATES IN Y82042 (C2)

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The carbonaceous chondrite Y82042 is unusual in consisting mainly of phyllosilicates (mostly serpentine, Grady *et al.*, 1987; Barber and Yanai, 1986). Olivine is subordinate and pyroxene is entirely missing, as are CAI's. Carbonates are unusually abundant and comprise calcite and dolomite. Three different carbonate-bearing objects can be distinguished all of which are enveloped by fine-grained phyllosilicates.

(1) Isolated grains
(2) Round (chondrule-like) polycrystalline intergrowth (Fig. 1a)
(3) Rims around amoeboide phyllosilicate aggregates (Fig. 1b)

The isolated grains are mainly calcites with minor contents of Mg, Fe, and Mn. The total content of $(Mg,Fe,Mn)CO_3$ is usually less than 3 mol.-%. Only one of the isolated grains is dolomite containing appreciable amounts of Fe and Mn. The chondrule-like carbonate object is well rounded and consists of an intimate intergrowth of dolomite grains, clusters of dolomite-oxide-sulfide and minor phyllosilicate (Fig. 1a). The dolomites have variable Fe contents (Fig. 2). The amoeboide objects are reminiscent

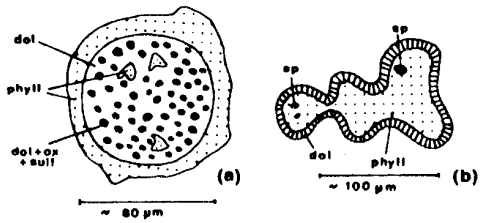

Fig. 1 (a) Round dolomite intergrowth (b) amoeboide object with dolomite rim.

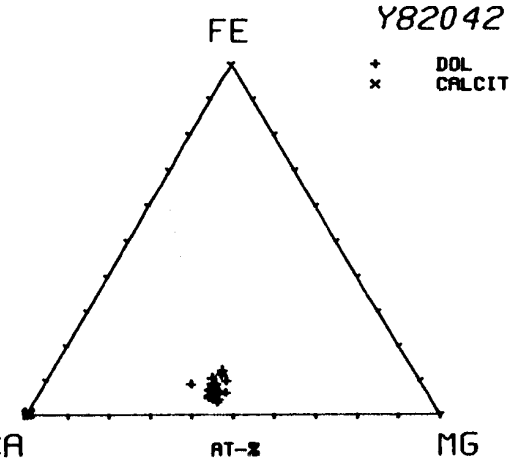

Fig. 2 Atomic proportions of Ca,Mg, and Fe in carbonates.

of amoeboide CAI's. They consist of a porous phyllosilicate intergrowth containing a few very small (1-2 μm) Mg-Al spinels and which is rimmed by dolomite. The dolomite is polycrystalline with anhedral elongated crystals being oriented perpendicular to the surface — like the diopside in rims of CAI's (e.g. Kurat, 1970). Variations in MnO contents are fairly large (1.3-3.7 wt.-%), less variable are Fe and Mg.

Conclusions: All carbonate objects encountered in Y82042 must have been formed and enveloped by phyllosilicates before incorporation into the Y82042 rock. Like many phyllosilicate objects (Barber and Yanai, 1986) they preserved delicate structures and grossly non-equilibrium compositions (highly variable MnO contents) and must therefore be considered to be of primary origin. Dolomite rims of the amoeboide objects appear to be pseudomorphs after diopside indicating high local P_{CO2} before accretion.

Barber, D.J. and K. Yanai, 1986. *Meteoritics* **21**, 330.
Grady, M.M. *et al.*, 1987. *Nat. Inst. Polar Res.*, Tokyo, Spec. Iss. (in press).
Kurat, G., 1970. *EPSL* **9**, 225.