ON THE RELATIONSHIP BETWEEN CAI EVOLUTION AND CHONDRULE FORMATION

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The relationship in time and space between CAI formation on the one hand, and chondrule formation on the other is not well understood. It appears that at least compact, coarse-grained CAI were once largely molten. They must have been very depleted in volatiles at that time. However, as now found in Allende they show extensive alteration to volatile rich minerals such as nepheline and sodalite. I have previously argued, partly on the basis of the ubiquitous presence of these volatile rich minerals also in chondrules and matrix, that this alteration probably took place on the Allende parent body (Housley, 1985).

Largely because of the extensive alteration, Allende is not a particularly promising place to look for the relationship between CAI and chondrules. Here I will describe some objects from much less altered Vigarano and ALHA77003, which seem to show evidence of CAI incorporation into chondrules.

One object from Vigarano is particularly striking. It consists of a metal/sulfide free core about 1 mm in diameter surrounded by a rim, about 0.2 mm thick, containing abundant metal/sulfide droplets. Cathodoluminescence shows a relic coarse-grained texture in the core. However, it now consists largely of micrometer scale intergrowths of anorthite and high Ca pyroxene interspersed with regions of Na, Cl rich glass. Several other minor minerals are also present. Although macroscopically sharp, the boundary between the core and the rim is microscopically continuous. However, grain sizes are larger in the rim, which also contains low Ca pyroxene and olivine.

I interpret the core of this object as a CAI fragment that had experienced volatile rich alteration and then was incorporated as a relic grain in an otherwise ordinary chondrule. This implies that the chondrule forming interval extended beyond the volatile rich alteration period for CAI. Also, the fine nonequilibrium texture of the core must impose a strong constraint on the chondrule cooling rate.

Housley, R.M., 1985. *Meteoritics* **20**, 666.

OBSERVATIONS ON THE ATMOSPHERIC DISRUPTION OF METEORITIC BODIES

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The disruption of meteoritic bodies in the atmosphere has been recognized almost since the first fall officially recognized by science — the L'Aigle, France, fall of 1803, which deposited from 2,000 to 3,000 stones. However, there has been little unanimity on the mechanics by which atmospheric disruption takes place. The most notable suggestions for its accomplishment have been: (a) the build-up of internal heat to such an extent that the meteorite explodes (Hauser, 1896); (b) meteorites that fall as showers have entered the atmosphere as swarms rather than as individuals (Olivier, 1925); (c) they have a brittle nature which causes them to break up in the latter portion of their flight (Merrill, 1929); (d) deep fissures develop as a result of sharp braking in the region of retardation (Krinov, 1960); (e) irregularities in the shape of the body result in differences in the compressive force acting upon different parts of it, which usually causes the body to split (Hutchison, 1983); (f) fracturing commonly occurs along pre-existing cracks produced by impacts with other space debris prior to capture by the earth (Wasson, 1985).

Studies of the shapes and internal structures of specimens collected from meteorite showers give partial credence to some of these suggestions while strongly refuting others.