ORIGIN OF ISOLATED OLIVINE GRAINS IN THE MURCHISON C2 METEORITE

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True chondrules in Murchison make up < 5 vol. % of the meteorite. They are discrete objects that break free of the matrix (defined in Fuchs *et al.*, 1973). They are often confused with loose aggregates that contain olivine, pyroxene, fine shreds or clumps of black phyllosilicates, and *no* glass, that are usually irregular in outline but may be rounded also. This study investigates the question of whether the break-up of true chondrules generated the loose individual olivine crystals and fragments that occur in the matrix ($\approx$ 25 vol. %). Previous work (Grossman & Olsen, 1974, and Olsen & Grossman, 1974) showed that euhedral olivine crystals in matrix possess surface morphology and metal inclusion compositions consistent with an origin by condensation from a solar nebular gas. The largest observed single olivine crystal in matrix, 1000 μm, is larger than the largest observed whole choldrule (900 μm). Thus, many of the larger olivine crystals and fragments measured in the matrix, 250-1000 μm, are too large to have been derived from even the largest chondrules, which contain small olivines that are never euhedral, but rather sub- to anhedral. Thus, while the break-up of true chondrules could produce sub- to anhedral olivine fragments they could not produce individual euhedral crystals. Within the loose aggregates (which make up $\approx$ 25 vol. % of Murchison), euhedral, subhedral, and (mostly) anhedral (fragmental) olivines, the mean size is < 12 μm, whereas the mean size of olivines in matrix (euhedral, anhedral, and subhedral) is 70 μm. Thus, disaggregation of these aggregates could not produce the isolated grains in matrix.

We conclude that based on grain size distribution, as well as morphology and metal-inclusion chemistry, the partial fragmentation and aggregation of olivines condensed individually from a nebular gas can produce the aggregates and chondrules, whereas disaggregation of these objects cannot produce the olivine grain population observed in matrix.

COSMIC SPHERULES AS ROUNDED BODIES IN SPACE*

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SEM photography of many 'stony' and 'iron' type spherules (from Atlantic and Pacific surface red clay) show features which suggest the aligned flight through the atmosphere, at grazing incidence, of a body that was already round in space. Some spherules show fusion only on one hemisphere, and others show no fusion anywhere. If fusion occurs it is only superficial.