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Isolated Olivine Grains Revisited

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Alongside chondrules and refractory inclusions, chondrites contain isolated olivine grains (IOG). While early authors favored a condensation origin [1-3], textural, chemical and isotopic similarities with chondrules have soon suggested derivation from the latter [4-7]. Yet, some refractory IOG still suggested distinct formation events [3,7,8].

We [9] performed cathodoluminescence, electron microprobe and oxygen isotopic analyses of carbonaceous chondrite IOG. We confirm their isotopic and chemical analogies with *bona fide* chondrules. About half of them display nearly continuous enstatite rims and concentric decrease in refractoriness outward. This indicates that the IOG interacted with hot gas as free-floating objects. Most likely, these were splashed out of chondrules while they were still partly molten. This suggests frequent collisions during chondrule formation.

[1] Fuchs et al. (1973) *Smithsonian Cont. Earth Sci.* 10:1-39. [2] Olsen and Grossman (1978). *EPSL* 41:111-127. [3] Weinbruch et al. (2000). *M&PS* 35:161-171. [4] McSween (1977). *GCA* 41:411-418. [5] Jones (1992). [6] Pack et al. (2005). *GCA* 69 :3159-3182. [7] Russell et al. (2000). *GCA* 74:2484-2499. [8] Steele (1986) *GCA* 53:2069-2079. [9] Jacquet et al. (2021). *M&PS* 56:13-33.

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