ORDINARY CHONDRITE-RELATED GIANT COSMIC SPHERULES.

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Micrometeorites are extraterrestrial particles smaller than ~2 mm collected on the Earth's surface [1]. Most of them melt during atmospheric entry; they are called cosmic spherules. A previous study [2] found that all three spherules with porphyritic olivine (PO) and cryptocrystalline (CC) textures were related to ordinary chondrites based on their oxygen isotopic signature. Here we report the oxygen isotope compositions of 15 giant (>800 µm) cosmic spherules from the Transantarctic Mountains, Antarctica [3], including 6 PO, 8 CC and 1 barred olivine (BO) textural types [4].

Eleven spherules (~70% of them: 4/6 PO and 6/8 CC, and the BO spherule) are related to ordinary chondrites based on oxygen isotopic compositions. In ordinary chondrite-related PO spherules olivines have $Fa_{8.5–11.8}$ composition, they are Ni-poor to Ni-rich (0.04–1.12 wt. %), and CaO-rich (0.10–0.17 wt. %). Ordinary chondrite-related spherules also have high magnetite contents (~2–12 wt. %). One PO and one CC spherules are related to previously identified ^{17}O-enriched cosmic spherules for which the parent body is unknown [2]. One CC spherule has an oxygen isotopic signature relating it with CM/CR carbonaceous chondrites.

These results show that the texture of cosmic spherules is not only controlled by atmospheric entry heating conditions but also depends on the parent body, whether be it through orbital parameters (entry angle and velocity), or chemistry, mineralogy, or grain size of the precursor.

References: [1] Rubin A.E. and Grossmann J. N. 2010. *Meteoritics & Planetary Science* 45:114-122. [2] Suavet C., Alexandre A., Franchi I. A., Gattacceca J., Sonzogni C.et al. 2010. *Earth and Planetary Science Letters* 293:313–320. [3] Rochette P. et al. 2008. *Proceedings of the National Academy of Sciences* 105:18206-18211. [4] Genge et al., 2008. *Meteoritics & Planetary Science* 43:497–515.

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