SUPERNOVA GRAPHITE GRAINS FROM ORGUEIL.

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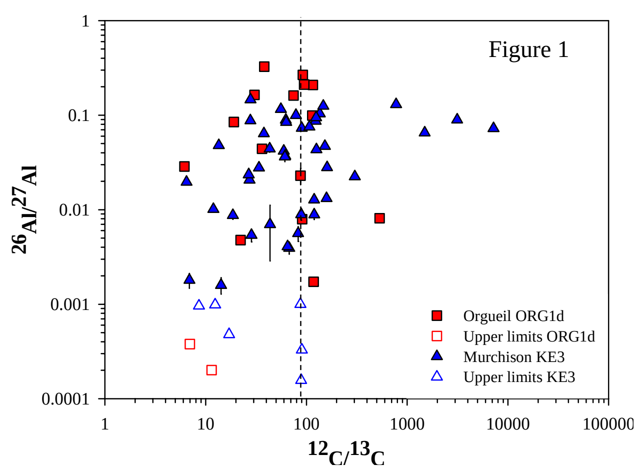
Introduction: In previous studies [1-3], some of the graphite grains from the low-density fraction of Orgueil, ORG1d ($\rho \sim$ 1.75-1.92 g cm^{-3}; grain sizes > 1 μm), were found to have isotopic signatures in N, O, and Si that indicated a supernova (SN) origin. In a continued attempt to better understand SN graphite grains, we isolated ORG1d candidate grains from the large amounts (much larger than in graphite separates from Murchison) of macromolecular carbonaceous material, in which the graphite grains are often found embedded. This was done to reduce contamination from this carbonacous material and, hence, facilitate the isotopic analyses. Here we present C, N, O, Si and Al-Mg isotopic data obtained with the NanoSIMS, for the grains of this fraction. The same grains will be analyzed for Ti isotopes and, eventually, heavy element isotopes (Sr, Zr, Mo, Ru, Ba) by resonant ionization mass spectrometry (RIMS) with CHARISMA.

Experimental: Spherical, carbonaceous grains identified by X-ray analysis in the SEM were picked with a micromanipulator and deposited on a gold-foil mount. Isotopic analyses of these grains were carried out in the NanoSIMS. Negative secondary ions of ^{12}C, ^{13}C, ^{12}C^{14}N and ^{12}C^{15}N (analysis phase 1) and, ^{16}O, ^{18}O, ^{28}Si, ^{29}Si and ^{30}Si (phase 2) produced by bombarding the sample with a Cs^{+} primary beam were counted in multidetection mode. In phase 3 of the analysis, positive secondary ions of ^{12}C, ^{24}Mg, ^{25}Mg, ^{26}Mg and ^{27}Al produced with an O^{-} beam were detected.

Results and Discussion: 18 of the 41 candidate carbonaceous grains were found to be presolar, as indicated by their ^{12}C/^{13}C ratios that vary from 6 to 910. We found 12 grains that contain ^{18}O excesses, with ^{18}O/^{16}O ratios of up to 15 times the solar value. 8 of these grains also exhibit ^{15}N excesses and 6 contain ^{28}Si excesses. These signatures indicate a SN origin for these grains [4]. In addition, 17 grains exhibit large ^{26}Al/^{27}Al ratios (up to 0.33) that were derived from ^{26}Mg excesses. In Figure 1 we compare the ^{26}Al/^{27}Al ratios of these grains with those of graphite grains from the Murchison KE3 low-density fraction [4]. The high ^{26}Al/^{27}Al ratios we found now were probably not seen in the previous study of grains from ORG1d [3] because of the large ^{24}Mg and ^{27}Al signals obtained from the contamination present on that mount. All the grains with ^{18}O, ^{15}N and ^{28}Si excesses have high ^{26}Al/^{27}Al ratios indicating that they are bonafide SN grains.



References: [1] Jadhav M. et al. 2005. Abstract #1976. *LPS XXXVI*. [2] Jadhav M. et al. 2005. *MAPS*, 40, A75. [3] Jadhav M. et al. 2006. Abstract #2177. *LPS XXXVII*. [4] Travaglio C. et al. 1999. *ApJ*, 510, 325-354.