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Minor element zoning in presolar SiC of supernova origin

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We performed NanoSIMS isotopic, as well as EDX major and minor element analyses on focussed ion beam (FIB) lamellae prepared from presolar SiC grains of supernova (SN) origin. We studied these FIB lamellae previously by transmission electron microscopy (TEM; [1]). The aim of our efforts was to check whether resolvable compositional and/or isotopic heterogeneities existed within our grains, similar to those observed in SN graphite [2].

None of the three grains whose isotope compositions have been measured so far showed detectable isotopic heterogeneity. However, a fourth grain had elevated N, Al and Mg contents in its rim relative to its core. Previous Mg isotope analysis indicated that the grain's Mg is monoisotopic ^{26}Mg , a product of ^{26}Al decay. Although the correlation of nitrogen and aluminum could indicate the presence of AlN (cf. [3]), this phase has not been observed by TEM. As minor element zoning does not correlate with the nanostructure of the grain, an ion implantation origin of the N and Al enrichment is considered.

[1] Kodolányi, J. et al. (2016) *LPSC XLVII*, Abstract #1478, [2] Groopman, E. et al. (2012) *ApJL*, 754, L8, [3]

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Stroud, R. et al. (2015) *LPSC XLVI*, Abstract #2576

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