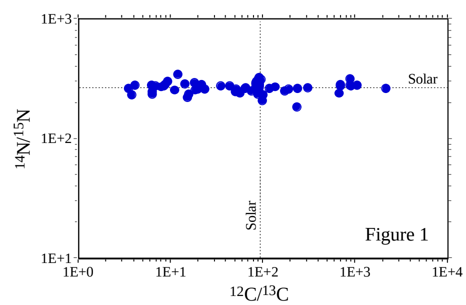
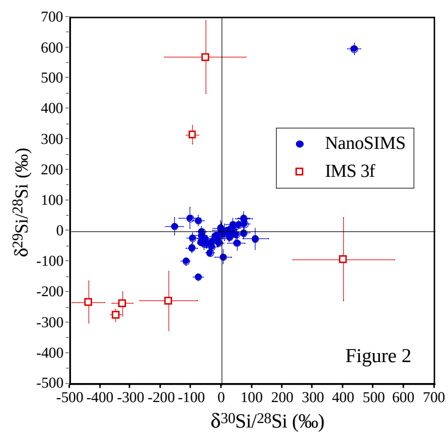
MULTI-ELEMENT ISOTOPIC ANALYSIS OF PRESOLAR GRAPHITE FRACTION KFA1 FROM THE MURCHISON METEORITE. S. Amari[1], A. Nguyen[1], E. Zinner[1], and R. S. Lewis[2], [1]Laboratory for Space Sciences and the Physics Department, Washington University, St. Louis, MO 63130, USA. [2]Enrico Fermi Institute, University of Chicago, Chicago, IL 60637, USA. (sa@wuphys.wustl.edu)

Introduction: Most primitive meteorites contain presolar graphite grains [1]. One of their most interesting features is that isotopic characteristics depend on density [2-4]. Isotopic analyses of individual grains have shown their $^{12}C/^{13}C$ ratios to vary from 2 to 7200 while most grains have close to normal N ratios, apparently the result of isotopic equilibration [3]. However, C isotopic ratios by themselves are not very diagnostic for the stellar origin of presolar graphite. Although isotopic ratios of other (minor and trace) elements are more diagnostic, previous measurements have been plagued by large uncertainties. A new type of ion probe, the NanoSIMS, with its high sensitivity [5] provides the capability to measure isotopic ratios of several elements with improved precision. We have embarked on a program to measure C, N, O, Mg, Si and Ti isotopic ratios in individual grains from the Murchison graphite fraction KFA1 (2.05-2.10gcm^{-3}) [6]. Here we report the first results.

Experimental: NanoSIMS isotopic analyses were made in multi-detection mode. C and N isotopic ratios were measured in 119 grains, Si isotopic ratios in 41 grains that showed anomalous C isotopic ratios.

Results: Figures 1 and 2 show the C, N and Si isotopic ratios. The C and N ratios agree with previous measurements [3]. In Fig. 2 we also plot previous data obtained with the IMS 3f ion probe that differ from terrestrial by more than 2σ. Many grains have ^{28}Si excesses, indicating a supernova origin [7]. However, there are several grains with large ^{29}Si and/or ^{30}Si excesses and it will be interesting to see what their O, Mg and Ti isotopic ratios are going to be.





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