CONTINUED ISOTOPIC STUDIES OF PRESOLAR GRAPHITE FROM ORGUEIL. M. Jadhav[1], S. Amari[1], E. Zinner[1], and T. Maruoka[1]*, [1]Laboratory for Space Sciences, Washington University, St. Louis, MO 63130, USA. (mjadhav@wustl.edu) *present address: Graduate School of Life and Environmental Sciences, University of Tsukuba, Ibaraki 305-8572, Japan.

Introduction: Earlier this year we reported the successful isolation of presolar graphite from Orgueil [1]. We presented NanoSIMS C and O isotopic data on three density fractions: ORG1b (1.59-1.67 g cm^{-3}), ORG1d (1.75-1.92 g cm^{-3}) and ORG1g (2.04-2.12 g cm^{-3}). While only isotopically normal grains were found in ORG1b, ORG1d, and ORG1g have presolar graphite as indicated by their C isotopes. Ten grains from ORG1d have ^{18}O excesses, indicating a supernova (SN) origin. Here we report C, N, O and Si isotopic analyses of three new density fractions: ORG1c (1.67-1.75 g cm^{-3}), ORG1f (2.02-2.04 g cm^{-3}) and ORG1i (2.16-2.30 g cm^{-3}) and N and Si isotopic data on the anomalous fractions (ORG1d and ORG1g).

Experimental: Carbonaceous grains identified by X-ray analysis in the SEM were analyzed in the NanoSIMS in multidetection mode. $^{12}C^-$, $^{13}C^-$, $^{16}O^-$ and $^{18}O^-$ (phase 1) and, $^{12}C^{14}N^-$, $^{12}C^{15}N^-$, $^{28}Si^-$, $^{29}Si^-$ and $^{30}Si^-$ (phase 2) secondary ions were counted by bombarding the sample with a Cs^+ primary beam.

Results and Discussion: The new fractions, ORG1c, 1f and 1i all contain presolar graphite with $^{12}C/^{13}C$ ratios that range from 4-1746. The abundance of grains with isotopically light carbon increases with density. ORG1c has one ^{18}O-rich grain but ORG1f and 1i exhibit solar $^{16}O/^{18}O$ ratios. This agrees with the trend reported previously in Orgueil and Murchison [1, 2], that the abundance of ^{18}O-rich grains decreases with increasing density. Seven out of the ten ^{18}O-rich grains from ORG1d were found to be enriched in ^{28}Si. Both these signatures point to a SN origin [3]. These grains also contain isotopically heavy nitrogen. The rest of the fractions have relatively normal $^{14}N/^{15}N$ ratios, with a few exceptions that are enriched in ^{15}N. Figure 1 shows the $^{29}Si/^{28}Si$ and $^{30}Si/^{28}Si$ ratios measured in the heavy fractions ORG1f, 1g and 1i. While the lower-density fractions have ^{28}Si-rich grains, these high-density fractions have grains that are enriched in ^{30}Si and ^{29}Si. Most ^{30}Si-rich grains contain isotopically light carbon. These signatures are expected for low-metallicity AGB stars where ^{12}C and $^{29,30}Si$ are dredged up from the He shell into their envelopes. These stars are the most likely source for the high density graphite grains in Orgueil that display ^{30}Si and ^{12}C excesses.

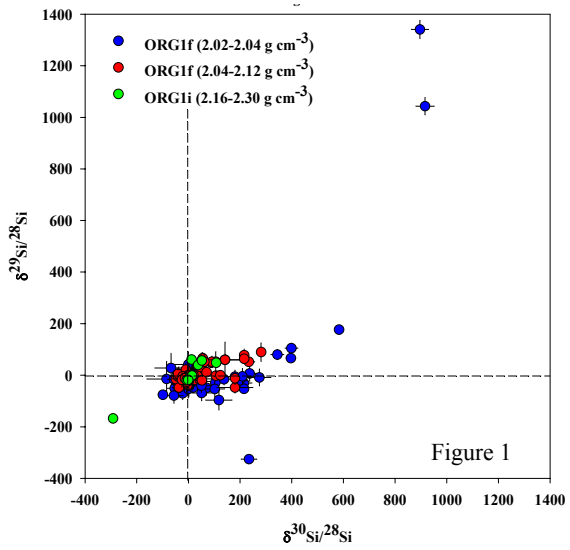

Figure 1

References: [1] Jadhav M. et al. 2005. Abstract #1976. *LPS XXXVI*. [2] Hoppe P. et al. 1995. *GCA* 59: 4029-4056. [3] Travaglio C. et al. 1999. ApJ. 510, 325-354.