**S-PROCESS Sr AND Ba IN SiC FROM MURCHISON SERIES KJ;** C.A. Prombo[1], F.A. Podosek[1], S. Amari[1,2], and R.S. Lewis[2]. 1. McDonnell Center for Space Science, Campus Box 1105, Washington U., 1 Brookings Drive, St. Louis, MO 63130, 2. Enrico Fermi Inst., U. of Chicago, 5630 S. Ellis Avenue, Chicago, IL 60637.

Silicon carbide chemically isolated from Murchison and other meteorites is generally believed to be pre-solar material. It exhibits strong isotope anomalies in several elements [1-3] including excesses of s-process isotopes of the heavy elements [4-6]. We have previously reported thermal ionization isotope analyses of Ba in the bulk SiC sample KJ from Murchison [6], prepared at the University of Chicago [7]; in this abstract we report the results of Sr and additional Ba analyses of size-separated fractions of KJ.

The samples (about 1 μg each) were direct-loaded on V-shaped Ta filaments with 1 μl of 1 N $H_3PO_4$. Strontium isotope analysis was performed on a VG-354 thermal ionization mass spectrometer using a Daly detector in single-collector pulse-counting mode. Corrections were made for $^{87}$Rb interference by monitoring $^{85}$Rb and assuming solar Rb isotope composition.

As with Ba, the measured Sr isotope composition is variable during the analysis of a given sample, indicating the presence of at least two isotopically distinct components (one of which may be terrestrial normal blank); the range of variation in Sr is smaller than that in Ba. Figure 1 shows the unweighted means of the six most anomalous sets of our Sr data for KJB (uncorrected for instrumental discrimination) and, for comparison, the composition of sample R1CPD reported by Ott and Begemann [8]. Figure 2 shows unweighted means for $^{84}$Sr/$^{86}$Sr and $^{88}$Sr/$^{86}$Sr in samples KJB, KJD and KJE (grain size increasing in that order); the bars reflect compositional variation, not analytical uncertainty. For KJB, which appears to consist of two populations of grains, two compositions (early and late data in the analysis) are shown.

The most prominent isotope effect in the Sr data is a strong deficiency of $^{84}$Sr. Since $^{84}$Sr is a p-process only isotope, and the heavier isotopes are produced primarily in the s-process, this feature indicates excess s-process contributions. Variations in the proportions of the heavier isotopes are more modest but still significant (i.e. beyond plausible variations in instrumental discrimination).

Since our initial report [6] on the barium isotope composition of the parent fraction KJ, we have measured the Ba compositions of KJC, KJD and KJE. In Figure 3 the individual data sets (2σ errors) are plotted for KJ and KJE, whereas for KJC and KJD unweighted means of the data sets are plotted. It is apparent that KJ and KJE each appear to be composed of at least two components with the relative amounts of each component emitted varying during the analysis. KJC and KJD each exhibit little variation in their measured compositions. For $^{138}$Ba/$^{136}$Ba vs $^{135}$Ba/$^{136}$Ba the lines defined by KJ and KJE are well resolved from each other and the compositions of KJC and KJD lie between the lines defined by KJ and KJE. For $^{137}$Ba/$^{136}$Ba vs $^{135}$Ba/$^{136}$Ba and $^{134}$Ba/$^{136}$Ba vs $^{135}$Ba/$^{136}$Ba there is a strong indication that the data for KJ and KJE do not fall along the same line in each plot.

Figure 1

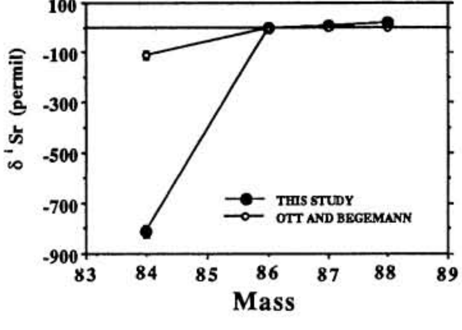
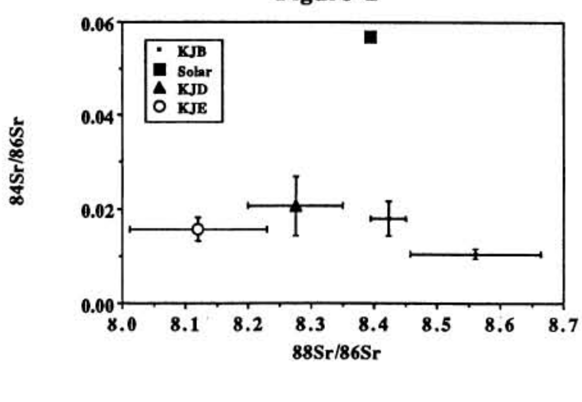



Figure 2



Nucleosynthetic component compositions calculated by correcting for p-process contributions are variable from one size fraction to another and also within at least some fractions. Such variations correlate with grain size, e.g. in our data and also in the Ba data of Zinner et al. [5]. $^{138}Ba/^{136}Ba$ ratios decrease with increasing grain size, as also does $^{88}Sr/^{86}Sr$. Such variation is plausibly attributable to variable neutron exposure in the s-process. Gallino et al. [9] predict that both $^{138}Ba/^{136}Ba$ and $^{88}Sr/^{86}Sr$ should increase with increasing s-process neutron exposure, so the sense of the observed trend is lower average neutron exposure in the coarser fractions. This is in contrast to the trend shown by the $^{86}Kr/^{82}Kr$ ratio, which increases with grain size [2], suggesting that Kr in the larger grains experienced higher neutron exposures than Kr in the smaller grain size fractions. This is not necessarily a contradiction: it may be that the Kr comes from a smaller and/or different population of grains than does the Sr and Ba. This possibility is supported by the results of Nichols et al. [10,11] who measured Ne-E contents of individual SiC grains and found that the bulk of the Ne-E is contained in only a small fraction of the grains.

**References**: [1] M.Tang and E. Anders (1988) GCA **52**, 1235. [2] R.S. Lewis et al. (1990) Nature **348**, 293. [3] U. Ott et al. (1988) Nature **333**, 700. [4] U.Ott and F. Begemann (1990) Ap. J. **353**, L57. [5] E. Zinner et al. (1991) Ap.J. **382**, L47. [6] C. Prombo et al. (1991) Meteoritics, **26**, in press. [7] S. Amari et al. (1992) GCA, submitted. [8] U. Ott and F. Begemann (1990) LPS **XXI**, 920. [9] R. Gallino et al. unpublished data. [10] R. Nichols et al. (1991) Meteoritics **26**, in press. [11] R. Nichols et al. (1992) this volume.

Figure 3