EXCESS ^{235}U IN CHONDRITES: IMPLICATIONS FOR THE ^{247}Cm-^{235}U COSMOCHRONOMETER.

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The *r*-process only nuclide ^{247}Cm decays to ^{235}U with a characteristic half-life of ~16 million years. ^{247}Cm is presently extinct, but offers considerable potential as a short-lived *r*-process chronometer, providing constraints on the time interval between the last *r*-process nucleosynthetic event and the formation of the solar system. The existence of "live" ^{247}Cm in the early solar system should be manifested today as variations in ^{238}U/^{235}U, provided Cm was chemically fractionated from U when solids formed in the early solar system.

Using a Nu Instruments NuPlasma multiple-collector ICPMS and a high-purity mixed ^{233}U-^{236}U spike to monitor and correct for mass fractionation during chemical separation and isotopic analysis, we are able to resolve variations in ^{238}U/^{235}U at the two epsilon level ($2\sigma_M$; 1 epsilon = 1 part in 10,000) on sample sizes comprising <3 ng of total uranium, corresponding to <20 pg of ^{235}U.

Previous uranium isotopic measurements acquired on bulk samples of a suite of carbonaceous chondrite, ordinary chondrite and eucrite meteorites, for which conflicting results had previously been obtained, show no well-resolved excursions in ^{235}U/^{238}U from the terrestrial value at the ~2 epsilon level. These data constrain the amount of ^{247}Cm-produced excess ^{235}U atoms to less than ~1 x 10^8 atoms per gram of chondritic meteorite, with respect to terrestrial ^{235}U/^{238}U [1].

We have extended the search for "live" ^{247}Cm in the early solar system to small samples from mineral phases in primitive objects that are likely to display strong Cm-U fractionations. In particular, uranium isotopic measurements acquired on acid-etched leachates for a suite of chondritic meteorites show positive anomalies in ^{235}U/^{238}U with respect to the compositions of the bulk samples and the terrestrial standard. These excursions are consistent with a model in which excess ^{235}U was produced from the decay of live ^{247}Cm in the early solar system. As such, these data have important implications for the ^{247}Cm-^{235}U cosmochronometer and the timing of *r*-process nucleosynthesis relative to the formation of the solar system materials.

References: [1] Stirling C. H., Halliday, A. N and Porcelli D. *Geochimica Cosmochimica Acta* in press.