THE ^{129}Xe CONCENTRATIONS IN TROILITE INCLUSIONS OF IRON METEORITES.

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Introduction: Troilite inclusions (iron sulfide minerals, FeS) are quite common in iron meteorites and sometimes compromise detailed cosmic ray exposure (CRE) age studies based on cosmogenic ^{21}Ne and/or ^{26}Al [1]. On the other hand, troilite offers the opportunity to establish a new radioactive nuclide dating system, e.g., ^{129}I-^{129}Xe [2,3].

The ^{129}I ($T_{1/2}$ = 15.7 Ma) is produced by neutron capture reaction on Te, which is particularly abundant in troilite inclusions [3], which are therefore best candidates for the study and use of the ^{129}I-^{129}Xe chronometer. While the ^{129}I-^{129}Xe system is promising especially considering that the half-life of ^{129}I is longer than for any other so far studied cosmogenic radionuclides, the extraction and measurement of noble gases in troilite is challenging because of release of sulfur compounds such as H_2S.

Experimental Methods: Noble gas isotopes (He, Ne, Ar, Kr and Xe) have been measured by noble gas spectrometry at the University of Bern using a MAP-215-50 magnetic sector field mass spectrometer. The selected samples, after having been wrapped in either Al or Ni foils, were loaded into an all metal extraction line and degassed in a single temperature step at 1700°C. The extracted gases were purified and separated using active charcoals.

Results: Seven troilite samples have been separated from 4 different iron meteorites (Cape York, Casas Grandes, Trenton and Grant). To test first the extraction procedure, a small sample of each meteorite (~13 mg) has been analyzed. The residual blank after this measurement was low, therefore all other measurements were performed on bigger samples (~80-100 mg).

The isotopic ratios of Xe in the troilite separates have a composition similar to trapped meteoritic xenon [4], except slight excesses observable for ^{126}Xe, ^{129}Xe, and ^{131}Xe (normalized to ^{130}Xe). The isotopic ratios, normalized to ^{130}Xe, are in good agreement with the concentrations calculated in [3]. The Xe concentrations are a mixture of different components, such as planetary, fission, cosmogenic or radiogenic. Therefore, further work has to be done to determine the ^{129}Xe cosmogenic end-member.

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