I-Xe IN MAGNETIC FRACTIONS OF TWO UNGROUPED C2 AND C3 CARBONACEOUS CHONDRITES

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Introduction: Magnetites are one of the first alteration products formed in carbonaceous chondrites and thus provide insight for the onset and duration of aqueous alteration. I-Xe ages of Orgueil CI magnetites are reported to be oldest 2.1 ± 0.2 Ma after formation of CAIs [1, 2, 3] and the I-Xe system in magnetites from CV3 Bali and Kaba closed at 8.2 ± 0.3 Ma and at 11.8 ± 0.2 Ma after CAIs [4]. In CO3 chondrites the I-Xe ages of magnetites seem to reflect their petrologic type, responding to later aqueous processes from 16.3 ± 2.9 Ma to ~30 Ma after CAIs for 3.0 Colony, 3.5 Lance and Y-82094 respectively [5]. Here we report new data for two ungrouped carbonaceous chondrites of petrologic type 3 and 2.

Results: MAC87300,64 (C2-ung) and MAC88107,51 (C3-ung) were chemically treated in LiCL following procedure developed by Lewis and Anders [6]. SEM analyses confirmed resulting separates to be iron oxides with small amounts of Ni present. Aliquots of both samples have been saved for future, more detailed, morphological studies. The samples were irradiated in the Missouri University Research Reactor along with Shallowater (4,563.2 ± 0.6 Ma [7]), the absolute age and irradiation standard. Xenon isotopic compositions were measured in each fraction released in step-wise heating.

Although the magnetic separates studied here represent meteorites of different petrologic types, reflecting different degrees of aqueous alteration, they show a lot of similarities. For both samples the release profiles of radiogenic ^{129*}Xe are characterized by two distinct peaks, with about 90% of ^{129*}Xe being released in the 1000°C temperature step and the remaining released at 1400°C, each with distinct isochrons. Thus, it appears at least two iodine-bearing host phases which closed at different times are present in these magnetic separates.

In MAC87300,64 the low temperature release peak corresponds to an I-Xe age 2.9 ± 1.1 Ma younger than the Shallowater reference (6.9 Ma after CAIs). The low temperature phase of the MAC88107,51 magnetic fraction closed at 6.8 ± 3.0 Ma after Shallowater (10.8 Ma after CAIs). These results for the low temperature iodine phase of both samples are in good agreement with the previous I-Xe ages for magnetites from CV3 Bali and Kaba [4].

The I-Xe system in the higher temperature phases of magnetic separates closed at 3.7 ± 4.0 Ma and 4.0 ± 1.4 Ma (after CAIs) in MAC87300,64 and MAC88107,51 respectively, consistent with I-Xe ages of pyroxenes.

Supported by NASA grant #NNG06GE84G. We thank Tim Swindle for providing MAC87300 and MAC88107 meteorites.

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