ARGON ANALYSES OF LHERZOLIC SHERGOTTITES Y984028 AND Y000097.

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Antarctic Martian meteorites Yamato (Y) 984028 and Y000027/47/97 have similar textures, mineralogy, chemistry, and isotopic composition and are possibly paired [1,2,3]. We analyzed the argon isotopic composition of Y984028 whole rock (WR) and pyroxene mineral separates (Px) in order to evaluate their trapped Ar components and compare with Y000097 Ar data. WR and Px yield an apparent ^{39}Ar-^{40}Ar age spectra of roughly 2 Ga, much older than the crystallization age determined by other isotopic techniques. Sm-Nd and Rb-Sr ages for Y984028 are ~170 Ma [3]. This discrepancy is likely the byproduct of several coexisting Ar components, such as radiogenic 40Ar*, cosmogenic Ar, and trapped Ar from the multiple minerals, as well as multiple source origins. Similarly, the reported ^{39}Ar-^{40}Ar ag of Y000097 is ~260 Ma [4,5] with a Rb-Sr age of 147±28 Ma and a Sm-Nd age of 152±13 Ma [4]. Apparently Ar-Ar ages of both Y984028 and Y000097 show trapped Ar components. Stepwise temperature extractions of Ar from Y984028 Px show several Ar-components released at different temperatures. For example, intermediate temperature data (800-1100°C) are nominally consistent with the Sm-Nd and Rb-Sr radiometric ages (~170 Ma) [3] with an approximately Martian atmosphere trapped Ar composition with a ^{40}Ar/^{36}Ar ratio of ~1800 [6]. Based on K/Ca distribution, we know that ^{39}Ar at both lower and intermediate temperatures is primarily derived from plagioclase and olivine. Argon released during higher temperature extractions (1200-1500°C), however, differs significantly. The thermal profile of argon released from Martian meteorites is complicated by multiple sources, such as Martian atmosphere, Martian mantle, inherited Ar, terrestrial atmosphere, cosmogenic Ar. Obviously, Ar release at higher temperatures from Px should contain little terrestrial atmospheric component. Likewise, ^{129}Xe/^{132}Xe from high temperature extractions (1200-1800°C) gives a value [2] above that of terrestrial Xe ratio of 0.98. The most plausible explanation of the high temperature argon data is that it contains a Martian mantle ^{40}Ar component as well as excess ^{40}Ar assimilated from inherited magma [5, 7]

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