

CHARACTERIZING THE EFFECT OF SHOCK ON ISOTOPIC AGES II: Mg-SUITE TROCTOLITE MAJOR ELEMENTS. J. Edmunson¹ and B. A. Cohen². ¹NASA Postdoctoral Program, Marshall Space Flight Center. E-mail: Jennifer.E.Edmunson@nasa.gov. ²Marshall Space Flight Center.

Introduction: Two troctolites from the lunar magnesium suite (Mg-suite), 76335 and 76535, have ¹⁴⁷Sm-¹⁴³Nd and ⁸⁷Rb-⁸⁷Sr ages that do not indicate the same age for their respective sample. In the case of 76335, the ¹⁴⁷Sm-¹⁴³Nd age is 4278 ± 60 Ma [1], but the ⁸⁷Rb-⁸⁷Sr data does not reveal an isochron [2]. For 76535, the ¹⁴⁷Sm-¹⁴³Nd age is significantly younger (4260 ± 60 Ma [3]) than the ⁸⁷Rb-⁸⁷Sr age (4570 ± 70 Ma, $\lambda = 1.402 \times 10^{-11}$ [4]). This study was designed to discover why the ¹⁴⁷Sm-¹⁴³Nd and ⁸⁷Rb-⁸⁷Sr ages did not match for each individual sample.

Observations: Sample 76335 is composed of anorthite (An₉₈Ab₂) and olivine (Fo₈₈), with minor orthopyroxene (En₈₇Fs₁₂Wo₁) and various trace phases (including chromite, baddeleyite, zirkelite, metal, and merrillite). Microprobe analysis indicates that 76335 Fe-Ni-Co metal has Ni and Co abundances indicative of pristine rocks, supporting the conclusions of [5] and the status of 76335 as a monomict breccia.

Troctolite 76535 is unlike 76335 in most physical features, but is very much like 76335 in geochemistry. Sample 76535 is a coarse-grained annealed rock complete with 120° triple grain junctions [6], while 76335 is a cataclastite. Investigations are ongoing to determine if 76335 is part of the 76535 parent pluton, but with at least one subsequent cataclastic event that 76535 did not experience. There are a few points of evidence that would imply a shared origin. First, their geochemical pairing [7]. Second, their almost identical bulk trace element pattern [8, 9]. Third, the overlap of 76335 and 76535 in ¹⁴⁷Sm-¹⁴³Nd age versus \mathcal{E}_{Nd}^{143} space [1]. Lastly, remnant 120° triple grain junctions and small linear inclusions of pyroxene [10] in the anorthite of cataclastized 76335 match those observed 76535. These shared features may indicate that the samples originated from the same parent pluton. Thus, the near identical ¹⁴⁷Sm-¹⁴³Nd ages may indicate the true age of both troctolites, while the subsequent cataclastic event experienced only by 76335 may have disturbed the ⁸⁷Rb-⁸⁷Sr isotopic systematics sufficiently to prevent an isochron.

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