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Preliminary Ar-Ar studies of lunar basaltic meteorite Dhofar 287-A

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The recent increase of the lunar meteorite collection has been complementing our previous knowledge based on Apollo and Luna mission samples. Presently, there are 10 mare basalts available for study found both in cold and hot deserts. Despite the fact that a source on the lunar surface is not known, these meteorites have still provided us with important information on the chemical composition variation within each lunar mare. This is the case of the coarse grained, low-Ti basalt Dhofar 287-A which consists mainly of phenocrysts of olivine and pyroxene set in a fine-grained matrix composed of elongated radiating pyroxene and plagioclase crystals (converted to maskelynite) [1]. The olivine and pyroxene crystals show the existence of abundant cracks and prevasive impact melt veins [1] together with maskelynite these features suggest a shock stage 2b (~28-34 GPa) [3]. Another conspicuous feature of this rock is the large number of late-stage mesostasis composed mainly of fayalite, Si-K-Ba-rich glass, fluorapatite, and whitlockite [1]. Isotopic dating [4] suggest that the Rb-Sr system has been affected by desert weathering and thus no age was obtained. However, the Sm-Nd system appears unaffected and a crystallisation age of 3.46±0.03 Ga was determined. Besides crystallisation age, it is also intended to extract the timing of later events undergone by this meteorite. In the present study we report the initial results obtained for bulk rock analyses using the infra-red laser technique of the Ar-Ar dating method. The age spectrum suggests that the Ar release is affected by ^{39}Ar-recoil likely due to the fine grained matrix of the basalt. This may result from the small size of the sample (1.73 mg) analysed which may have not included any phenocrysts and thus only fine-grained matrix was analysed. The calculated total age of 3.142±0.010 Ga is obtained, corresponding to an initial trapped ^{40}Ar/^{36}Ar= ~0. This age suggests that the Ar-Ar system has been disturbed likely by a thermal event such as an impact. The ^{38}Ar/^{37}Ar suggests the existence of Cl-derived ^{38}Ar at the first two heating steps (e.g. terrestrial contamination). The reminder of the steps indicate mixing between trapped and cosmogenic argon corresponding to a CRE-age of 4.8 Ma. Further work in a larger sample will be also presented at the meeting. [1] Anand et al (2003) MAPS 38, 485-499 [2] Stöffler and Grieve (2007) Impactites. *In* D. Fettes and J. Desmons (eds.), Cambridge Univ. Press, UK, 82-92. [3] Shih et al. (2002) LPSC XXXIII, abst.# 1344.