**$^{40}$AR-$^{39}$AR DATING OF SOLAR GAS-RICH LUNAR METEORITE DHOFAR 1436.** E.V. Korochantseva[1,2], M. Trieloff[1] J. Hopp[1], A.I. Buykin[1,2] A.V. Korochantsev[2]. [1]Institut für Geowissenschaften, Univ. Heidelberg, 69120 Heidelberg, Germany (trieloff@min.uni-heidelberg.de). [2]Vernadsky Institute of Russian Academy of Sciences, Moscow, Russia.

$^{40}$Ar-$^{39}$Ar dating is one of the most important tools to decipher lunar chronology, and can also yield information about isotopic composition of trapped argon in solar gas rich breccias. Occasionally $^{40}$Ar-$^{39}$Ar dating is applied to lunar meteorites [1,2] to complement lunar history derived from the Apollo samples [3,4], but it was not yet applied to solar gas rich lunar meteorites.

We analysed two lithologies –dark matrix material and a brown clast of the lunar feldspathic impact-melt breccia Dhofar 1436 [5] by high resolution stepheating (29 and 33 extractions), in an ongoing initiative to study chronology and trapped argon components in desert meteorites [6,7]. Dhofar 1436 turned out to be a gas-rich lunar meteorite: Besides a typical atmospheric argon release <750°C, the brown clast and dark sample release significant amounts of trapped argon at > 1100°C (3.9 and 4.7 x$10^{-6}$ cc/g) with $^{40}$Ar/$^{36}$Ar ratios of 2.43±0.04 and 2.58±0.06, identified by high temperature isochrons comprising 13 and 21 extractions, respectively. Corresponding isochron ages are 4.49±0.11 and 3.48±0.19 Ga. However, high temperature extractions are extremely sensitive for correction of trapped argon: Correcting the brown clast sample with the same trapped argon composition as the dark matrix sample, the resulting age is indistinguishably 3.55±0.31 Ga. Hence, the well-defined isochron maybe an artifact by interference from atmospheric argon. Trapped “orphan” argon with $^{40}$Ar/$^{36}$Ar ratios of up to 15 is a well known feature of lunar soils and considered as antiquity measure [8]. Our values correspond to an antiquity of about 1.5 Ga. The origin of orphan argon is debated, most studies view it as a mixture of implanted solar and lunar radiogenic argon degassing from the moon. Alternatively, we consider a mixture of solar and excess $^{40}$Ar, probably remobilized during major degassing (impact) events. This is in line with our observations on asteroidal meteorites [7], where we detected isochrons identifying trapped argon of clearly non-solar and non-atmospheric composition (though carrier phases remained unclear when compared to terrestrial samples [e.g., 9,10]). Finally, the $^{36}$Ar/$^{38}$Ar ratio associated with orphan argon im Dhofar 1436 is only marginally higher than atmospheric argon composition of 5.32, but much lower than the solar argon value of 5.77 and similar to trapped Q argon [11].

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