NOBLE GAS STUDY OF THE NEW LUNAR HIGHLAND METEORITE DAR AL GANI 400. P. Scherer, M. Pätsch, and L. Schultz, Max-Planck-Institute for Chemistry, Department of Cosmochemistry, P.O. Box 3060, 55020 Mainz, Germany (scherer@mpch-mainz.mpg.de).

Introduction: Dar al Gani 400, the third lunar meteorite found outside of Antarctica, was recovered in the Libyan part of the Sahara early this year. Preliminary studies indicate that it is a lunar highland breccia [1].

The abundance and isotopic composition of all noble gases was studied in five different bulk samples. Stepwise heating experiments are in progress to characterize the trapped components. In addition we apply this technique to gain more information about a contamination with terrestrial noble gases probably caused by abundant carbonate veins which cut through the entire sample.

Noble gas composition: Dar al Gani 400 is one of few lunar meteorites containing only small amounts of solar trapped gases. The elemental abundance pattern of trapped gases (Fig. 1) reveals that it is depleted in ^{4}He and ^{20}Ne relative to the composition of solar particle radiation. It has an abundance pattern comparable to MAC 88104 [2]. Only two lunar meteorites contain less trapped gases, Y 82192 [3] and A 881757 [4], which has virtually no trapped gases. A fit through all available data yields a value for trapped $^{20}Ne/^{22}Ne = 11.2 \pm 0.2$ which is in agreement with the SEP value of 11.3 ± 0.3.

It is difficult to separate Ar into trapped, radiogenic and atmospheric components and to determine a retention age because Ar and K are influenced by terrestrial alteration products.

Exposure History: The exposure time to cosmic rays is ~ 1 Ma ($^{21}Ne_c = 0.25 \times 10^{-8}$ cm^3 STP/g) assuming a 4π irradiation and applying methods described by [5]. The production rate P(^{21}Ne) of 0.229×0^{-8} cm^3 STP/g Ma is calculated using bulk chemical data obtained by INAA and XRF [1]. However, if we consider a 2π irradiation on the Moon and adopt a production rate P(^{21}Ne) of 0.085×10^{-8} cm^3 STP/g Ma [6] an age of ~3 Ma is evaluated. Both ages are rather small compared to the several hundred Ma for the 2 π exposure of most lunar breccias. To determine the detailed and possibly complex exposure history it is necessary to have measurements of cosmogenic radionuclides which are not yet available.

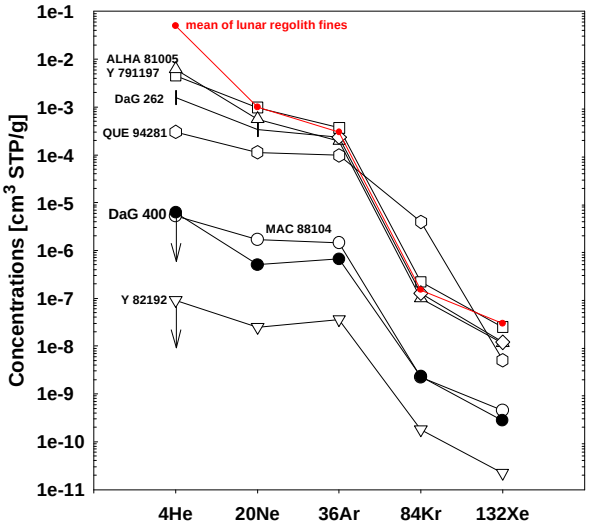

Fig. 1. Elemental abundance pattern of trapped noble gases in some lunar samples [2–4,7–10].

Summary: Dar al Gani 400 contains only small amounts of solar noble gases. It is depleted in He and Ne possibly due to thermal stress. The heavy noble gases contain an atmospheric component introduced by terrestrial alteration products. DaG 400 is not paired with DaG 262.

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