NOBLE GAS STUDIES OF DHOFAR 378 MARTIAN METEORITE. J. Park[1] and K. Nagao[1], [1]Laboratory for Earthquake Chemistry, Graduate School of Science, University of Tokyo, Hongo, Bunkyo-ku, Tokyo 113-0033, Japan.

Introduction: Dhofar 378 (Dho 378), weighing 15 g, was found in Oman (2000) and classified as basaltic shergottite. It was somewhat similar and recovered from the near area with Dhofar 019, but they are not a pair [1].

Experimental Method: Dho 378 was analyzed by using a mass spectrometric system (modified-VG5400/MS-II). Before starting measurement, we put Dho sample into the diluted-HNO_3-solution with ultrasonic waves. Because it looked like brittle easily and weathered, it needs to remove the weathering products from hot desert before preheating for avoiding adsorption of terrestrial gases. Noble gases in Dho 378 were extracted by total melting method (0.0165 g at 1800 °C) and stepwise heating method (0.0622 g at 400, 600, 800, 1000, 1300 and 1750 °C).

Results and Discussion: The concentrations of the cosmogenic nuclides ^{3}He, ^{21}Ne, and ^{38}Ar (10^{-9}cm^{3}STP/g) are (1) SH-22.6, 5.39, 2.57, (2) TM-19.7, 4.37, 2.80, respectively. K-Ar ages and cosmic-ray exposure ages of Dho 378 are given in Table 1. Dho 378 has typical ejection age as basaltic shergottites summarized in [2], while Dho 019 show the longest among the SNC meteorites [3]. K-Ar age is estimated by using ^{40}Ar concentrations and the average K concentrations of 830ppm for Dho 378 [4]. The obtained age is about 0.79~1.19 b.y., which is a typical for basaltic shergottites.

TABLE 1. The cosmic-ray exposure ages and K-Ar ages.

Dhofar 378	T_3	T_{21}	T_{38}	K-Ar age
	Ma			Ga (K=830ppm [4])
SH	1.35	3.64	1.68	1.19±0.12
TM	1.20	2.99	1.82	0.79±0.09

(SH: stepwise heating method, TM: total melting method)

FIG 1. ^{84}Kr/^{132}Xe vs ^{129}Xe/^{132}Xe.

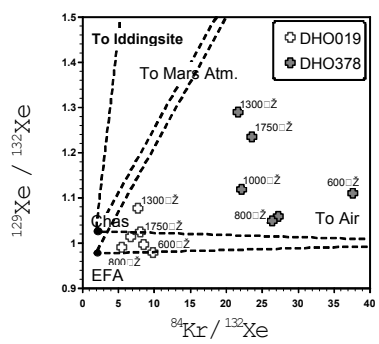

Fig 1 shows the heavy noble gas ratios of Dho 378 and Dho 019. The lower temperature data of Dho 378 (under 1000°C) plot toward Air, while high temperature data have a tendency toward Martian atmosphere, which suggest the presence of trapped Martian atmospheric component. On the other hand, Dho 019 data plot between three components, Chassigny, Elementally Fractionated Air (EFA) and Air. Heavier noble gases, likely fractionated terrestrial atmosphere, may be trapped on the meteorites or weathering products produced in the hot desert [5].

References: [1] Ikeda Y. et al. (2002) *LPS, XXXIII,* 1434. [2] Nyquist et al (2001) *Space. Sci. Reviews. 96*, 105-165. [3] Park J. et al (2001) *Meteorit. Planet. Sci., 36 (suppl),* A157. [4] Dreibus G. et al (2002) *Meteorit. Planet. Sci., 37,* A43. [5] Mohapatra R. K. et al. (2002) *LPS, XXXIII,* 1532.