NITROGEN AND LIGHT NOBLE GASES IN PARSA ENSTATITE CHONDRITE. S.V.S. MURTY, Physical Research Laboratory, Navrangpura, Ahmedabad-380009, INDIA.

Nitrogen and light noble gases have been analysed in three bulk samples and an aubritic nodule in Parsa, an EH3 chondrite. While the three bulk samples show varying amounts of trapped He, Ne of solar composition, the nodule is totally devoid of trapped He, Ne. The ^{15}N contents in bulk samples vary from 119 ppm to 197 ppm with $\delta^{15}N$(‰) ranging from -22.6 to -31.2, while for the nodule N=140 ppm with $\delta^{15}N$(‰)= -13.4. The spread in both N and $\delta^{15}N$ in Parsa is due to heterogeneous distribution of N bearing minerals with differing $\delta^{15}N$ signatures. The higher N contents of the nodule as well as its $\delta^{15}N$ signatures, as compared to normal aubrites is suggestive that it may not be genuine aubrite.

Solar gases have been recently reported in Parsa[1]. In an effort to check whether solar gases are uniformly distributed throughout Parsa or they are located in specific phases, we analysed two additional samples of bulk Parsa and one aubritic nodule for N and noble gases. Nitrogen studies are intented for the understanding of the nitrogen components distribution in E-chondrites.

Experimental: The Parsa nodule is very clean, while the bulk Parsa samples are rusty due to weathering. They have all been cleaned to be free of rust. Additionally the sample Parsa-2 has been etched for a short duration in dil. HF to see if the trapped He, Ne can be etched away. Petrological discription of Parsa and the nodule have been given by Nehru et al. [2] and Prinz et al. [3]. In all the four samples N and noble gases have been analysed by stepped pyrolysis, using standard procedures [4]. Here we discuss the results of N and light noble gas.

He, Ne and Ar: The data of the isotopic ratios are given in Table-1. The amounts and elemental ratios of the trapped components of all the samples are given in Table-2. The Ne isotopic composition of the nodule is purely cosmogenic, while the 20/22 values of the bulk Parsa samples clearly show the presence of trapped Ne. The varying values of 20/22 show that the amount of trapped Ne in these three samples is variable. The stepped temperature Ne isotopic data for Parsa-2 and Parsa-3 plot similar to Parsa-1 [1] showing solar wind composition for the trapped Ne. For the nodule, all temperature fractions gave pure cosmogenic Ne ratios. This clearly demonstrates that trapped Ne of solar composition is heterogeneously distributed in Parsa, just like in ALHA 77295 [5] and that the aubritic nodule is not the carrier of solar gases. These conclusions have also been reflected in the trapped amounts of ^{4}He, ^{20}Ne and the ratio (4/20)Trapped (Table-2).

Nitrogen: Both the N contents and $\delta^{15}N$ of the three bulk Parsa samples show variation. The release characteristics are also not identical for the three samples. The maximum N-release for these samples occurred in the 800°C to 1200°C range and the lightest N component has been released at 1200°C and 1400°C fractions. These characteristics are due to the heterogeneous

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distribution of N-bearing minerals with different $\delta^{15}N$ signatures in the Parsa meteorite. Similar N sysematics have been observed in other E-chondrites [6].

The N-systematics of the nodule are entirely different from the bulk samples. The maximum release (~90%) occurred at 1400°C with $\delta^{15}N$(‰)= -10.4, while the low temperature fractions (800 to 1200°C) comprising of ~9% N have $\delta^{15}N$ (‰)= -40.3. The higher N conetnts in this nodule, as well as its complex $\delta^{15}N$ structure, as compared to the normal aubrites [6,7,8], is suggestive that the nodule is not a genuine aubrite, as has also been suggested by Kiel [9].

Table-1: Nitrogen and light noble gases in Parsa samples

Sample	N (ppm)	$\delta^{15}N$ (‰)	$\frac{20}{22}$	$\frac{21}{22}$	$\frac{3}{4}$ ($\times 10^4$)	$\frac{38}{36}$	$\frac{40}{36}$
Parsa-1	197.5	-31.16 ± 1.87	3.022 .023	0.7200 .0102	35.79 1.64	0.2330 .0013	242.2 2.0
Parsa-2*	119.2	-26.29 0.69	2.515 .009	0.7470 .0022	62.75 5.27	0.2303 .0005	116.0 .5
Parsa-3	157.5	-22.57 0.55	1.852 .010	0.7717 .0029	117.9 9.4	0.2636 .0006	292.0 1.7
Parsa Nodule	140.5	-13.42 0.57	0.862 .005	0.8907 .0023	227.4 19.0	0.7034 .0030	6925 37

Table-2:Trapped component in Parsa samples

Sample	^4He —10^{-8}cc STP/g—	^{20}Ne	$\frac{4}{20}$
Parsa-1	11186	24.5	456
Prasa-2*	4294	20.8	206
Parsa-3	844	8.8	96
Parsa-Nodule	~0	~0	-

*Etched with dilute HF

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