A GAS-RICH FRAGMENT OF THE ALLENDE METEORITE: "SOLAR" AND "PLANETARY" TRAPPED GASES, R. L. Palma, Department of Physics, Sam Houston State University, Huntsville, Texas and Dieter Heymann, Depts. of Geology & of Space Physics and Astronomy, Rice University, Houston, Texas.

At the 16-th Lunar and Planetary Conference, we reported on a gas-rich fragment of the Allende meteorite (1). The measurements were done on aliquots from sieve fractions of a disaggregated fragment of this meteorite. It appeared that the fragment contained only "solar"-type inert gases, particularly only so-called Neon-B of the element Ne. We have now done measurements on aliquots of the same materials, but with gas-extractions at 500, 700, 900, 1100, 1300, and 1500 °C (in several cases, too little gas was given off to be detected). All inert gases were measured. Also, measurements were done on magnetic as well as non-magnetic separates. Sufficient matter for this program was available only in the size fractions < 64 μm and of 105-250 μm. The He and Ne results are given in Table 1. Our observations and conclusions are:
1. Most of the He is always given off at 500 °C; increasingly smaller amounts are given off at higher temperatures. 2. In the case of Ne, there is usually a low-temperature (up to 500 °C) "maximum" plus a second one at 900 or 1100 °C. 3. The "low temperature" Ne is richer in Ne-B; the "high temperature" Ne is richer in spallation Ne and Neon-A. 4. Ar, Kr, and Xe commonly show only one release "maximum" at 900 or 1100 °C. The magnetic separates are richer in He and Ne than the non-magnetic separates and untreated samples. 5. The (129/136)-Xe ratios tend to show maxima near 700 °C. 6. Our sample appears to be "normal" Allende matter with "planetary" gases, exposed to solar wind at the surface of the Allende parent body. The irradiated matter was apparently consolidated and so mixed with Allende matter proper (unirradiated).

(1) D. Heymann and R. Palma, Lunar & Planet. Sci. XVI, 347, 1985.

TABLE 1

All gas concentrations are in units of 10^{-8} cc STP/gram. Entry headings are given only for sample #1.

Sample #1 : < 64 μm fraction; magnetic separate 0.03988 gram.

T, °C	He-4	(4/3)He	Ne-20	(20/22)Ne	(21/22)Ne
500	8416	792	85.2	10.88	.0768
700	2768	973	8.73	8.72	.314
900	687	570	4.33	3.89	.348
1100	506	2603	22.4	8.29	.195
1300	419	3455	14.3	9.75	.365

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Sample #2 : < 64 μm fraction; non-magnetic separate; 0.06105 gram.

500	7280	975	58.4	10.93	.0905
700	2672	932	12.7	9.22	.268
900	478	628	7.30	7.71	.389
1100	209	1376	9.60	7.45	.358

Sample #3 : < 64 μm fraction; untreated; 0.04656 gram.

500	7316	954	43.9	11.25	.122
700	1961	748	10.5	8.15	.272
900	427	588	5.88	6.71	.536
1100	207	1109	6.30	5.58	.409
1300	----	----	2.74	5.73	.346

Sample #4: 105-250 μm fraction; magnetic separate; 0.04457 gram.

500	1350	294	14.4	10.18	.0919
700	1024	497	4.27	5.92	.358
900	630	406	2.80	3.42	.620
1100	277	388	none	-----	1.742 (?)
1300	792	3098	24.91	7.07	.197
1500	713	7950	24.07	9.09	.0700

Sample #5 : 105-250 μm fraction; non-magnetic; 0.04986 gram.

500	2818	583	17.52	11.22	.103
700	1275	476	7.37	8.35	.365
900	451	312	none	----	1.042
1100	144	278	none	----	1.709(?)
1300	34	174	0.84	1.43	.945
1500	none	----	6.20	6.21	.295

Sample # 6 : 105-250 μm fraction; untreated; 0.05562 gram.

500	3636	688	55.8	12.11	.0647
700	1562	606	12.2	8.85	.258
900	503	370	4.81	5.01	.484
1100	64	92	none	-----	1.033
1300	16	116	0.73	1.39	.0799

Entry of "none" means that the signal from the instrumental blank was equal to or larger than the sample's signal.

Total Ar-36 contents of the < 64 μm fractions near 16; of the 105-250 μm fractions from 3 to 12. ^{84}Kr contents of the two sets are on the order 0.1 & 0.01 resp. Likewise, ^{132}Xe contents are on the order 0.1 & 0.01 resp. (all in units of 10^{-8} cc STP/gram).