NEON IN MATERIAL SEPARATES OF THE ALLENDE AND ORGUEIL METEORITES; R. L. Palma, Physics Dept., Sam Houston State University, Huntsville, TX 77341; D. Heymann, Dept. of Geology and Geophysics, Rice University, Houston, TX 77251.

We have initiated a series of experiments on carbonaceous meteorites in the hope of achieving material separates through the use of the mildest possible physical and chemical treatments. The first attempt to produce a physical separation of the carbon and noncarbon phases in the Allende meteorite was carried out by preparing seven sieve fractions from an Allende fragment which had been disaggregated by ultrasonic treatment in distilled water, interrupting periodically for cycles of freeze-thawing. This fragment was discovered to contain the first gas-rich matter known to occur in Allende and clearly indicated the presence of solar neon [1]. Magnetic and nonmagnetic separates were prepared from the remaining material of the two most gas-rich sieve fractions, and these were analyzed by stepwise heating along with unaltered samples in an effort to isolate the solar neon and the gas-rich matter [2]. In this experiment we attempted to achieve useful material separates by partitioning disaggregated material from the Allende and Orgueil meteorites between isoamyl alcohol and water.

Figure 1 is a flow chart of the treatment of the disaggregated Allende sample, and Figure 2 is a flow chart of the treatment of the disaggregated Orgueil sample. The samples were wrapped in aluminum foil and outgassed by RF induction heating in a molybdenum crucible. Larger and more gaseous samples were heated in a number of temperature steps. Although all of the noble gases were analyzed, only the neon concentrations (Table 1) and compositions (Figures 3 and 4) are reported here. Corrections to the mass 20 and 22 peaks from mass 40 and 44 double ionization were quite small. The errors indicated are one standard deviation.

The Allende data fall close to the cosmic ray corner of the triangle bounded by that composition and those of Ne-A [3] and solar energetic particle neon, SEP [4], in a three isotope correlation diagram (Figure 3). Only the two samples derived from the initial isoamyl separation fraction (samples 19 and 21) clearly indicate a trapped component. Also, all samples of material which separated into isoamyl fractions (samples 15, 18, and 21) have greater neon concentrations than their counterpart samples in the water fractions (samples 14, 17, and 20). These data support the original expectation that grains with organic coatings would go into the isoamyl fractions and contain whatever trapped components there might be.

The Orgueil data (Figure 4) show the same trends as the Allende data, although the compositions are distinctly different. The low temperature release data from water fraction samples with a water fraction precursor (samples 24, 31, and 32) have the largest cosmic ray component. The higher temperature release data from these samples is essentially Ne-A with only a very small cosmic ray component. In contrast, the low temperature release data from sample 27, which is from an isoamyl fraction, is essentially atmospheric. Sample 28, which remained in the isoamyl phase after four separation procedures, appears distinctly below the Ne-A--cosmic ray mixing line, and may contain the Ne-E component seen earlier in this meteorite [5, 6, 7].

References: [1] Heymann, D. and Palma, R. L. (1986), *Proc. 16th Lunar Planet. Sci. Conf., Part 2, J. Geophys. Res. 91*, D460-D466; [2] Palma, R. L. and Heymann, D. (1988), *Proc. 18th Lunar Planet. Sci. Conf.*, 525-536; [3] Black, D. and Pepin, R. (1969), *Earth Planet. Sci. Lett. 6*, 385-394; [4] Weiler, R., Bauer, H., and Signer, P. (1986), *Geochim. Cosmochim. Acta 50*, 1997-2017; [5] Eberhardt, P. (1974), *Earth Planet. Sci. Lett. 24*, 182-187; [6] Eberhardt, P. (1978), *Proc. 9th Lunar Sci. Conf.*, 1027-1051; [7] Jungck, M. H. A. and Eberhardt, P. (1979), *Meteoritics 14*, 439-441.

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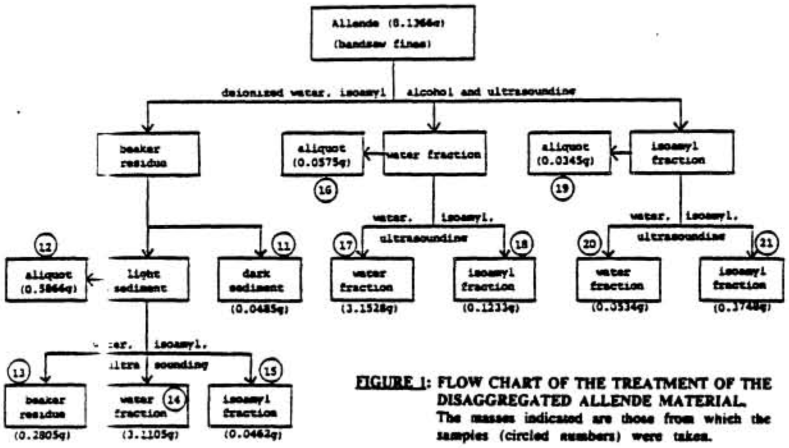

FIGURE 1: FLOW CHART OF THE TREATMENT OF THE DISAGGREGATED ALLENDE MATERIAL. The masses indicated are those from which the samples (circled numbers) were taken.

SAMPLE	$^{22}Ne(10^{-8})$	error
Allende 12	1.339	0.057
Allende 13	1.043	0.040
Allende 14	1.604	0.055
Allende 15	1.919	0.068
Allende 16	1.404	0.055
Allende 17	1.478	0.053
Allende 18	2.031	0.084
Allende 19	3.08	0.11
Allende 20	1.553	0.064
Allende 21	2.90	0.10
Orgueil 22	4.78	0.20
Orgueil 24, 6	1.228	0.063
Orgueil 24, 9	0.863	0.056
Orgueil 24, 12	0.673	0.051
Orgueil 24, 15	0.105	0.015
Orgueil 25	2.69	0.21
Orgueil 26	2.55	0.18
Orgueil 27, 6	11.32	0.38
Orgueil 27, 15	0.891	0.069
Orgueil 28	2.00	0.21
Orgueil 29	3.18	0.28
Orgueil 30	2.51	0.19
Orgueil 31, 6	0.872	0.080
Orgueil 31, 15	1.174	0.084
Orgueil 32, 6	1.711	0.077
Orgueil 32, 10	0.852	0.047
Orgueil 32, 15	0.330	0.029

TABLE 1: Neon gas concentrations (cc/g STP)

For samples heated in more than one step, the number after the sample number is the gas release temperature divided by 100.

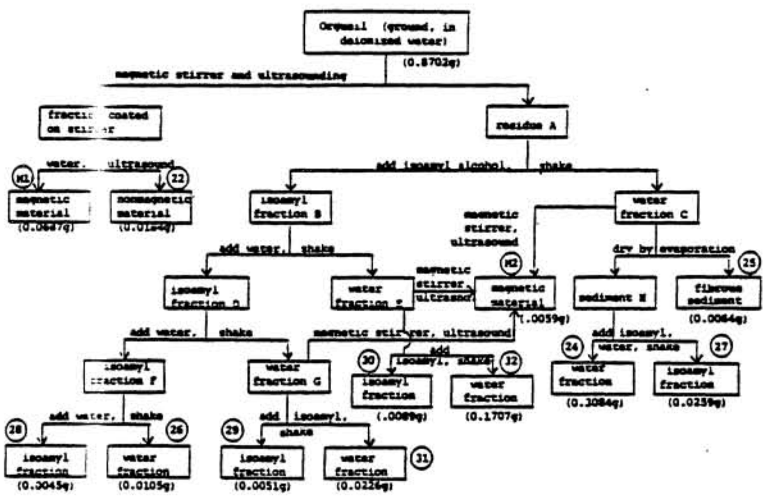

FIGURE 2: FLOW CHART OF THE TREATMENT OF THE DISAGGREGATED ORGUEIL MATERIAL. The masses indicated are those from which the samples (circled numbers) were taken.

FIGURE 3: ALLENDE NEON

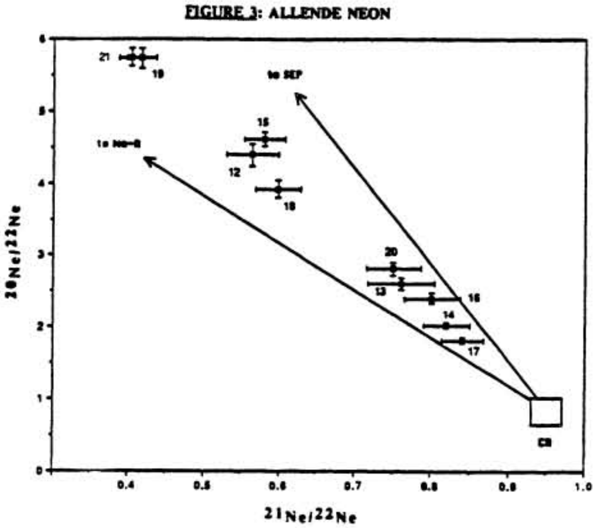

FIGURE 4: ORGUEIL NEON