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WEATHERING EFFECTS AND SOLAR COMPONENTS IN TWO ALLEN HILLS CHONDRITES. J.T. Padia and M.N. Rao, Physical Research Laboratory, Ahmedabad, India 380 009.

We have studied two Allen Hills chondrites, ALHA 77252 and ALHA 77215 belonging to the L-group, by stepwise heating mass spectrometric methods for elemental and isotopic composition of noble gases.

The neon data points representing 600°C, 900°C, 1200°C and 1600°C temperature fractions are plotted in the three isotope neon diagram, Fig. 1. All the data points, including the first temperature fractions (i.e. 600°C) fall much below the solar wind point (SW) in Fig. 1, clearly indicating the complete removal of solar wind from these samples. These two ALHA samples were found to contain irradiated track-rich grains (1) and hence are considered to be gas-rich meteorites. It may be noted here, that prior to performing the mass spectrometric analysis, we have not given any chemical etching treatment to these samples in our lab. The distribution of the data points of ALHA 77252 and ALHA 77215 samples in Fig. 1 suggests that the surface sited loosely bound solar wind was driven away from the irradiated grains by some natural etching process. As these Allen Hills chondrites were lying in Antarctic ice for several thousands of years and while most of the interior metal grains in these samples show signs of weathering, it is likely that the weathering process could have resulted in chemical etching of the grain surfaces over long periods of time, driving away the implanted SW from these grains.

In the case of the etched mineral residues, (after the solar wind removal) the data points represent varying mixtures of implanted solar flare neon and combined GCR and SCR spallation depending on their cosmic ray exposure history. For a given sample, the data points could be fitted to a best-fit line (not shown in Fig. 1). In the case of ALHA 77215, this line when extrapolated upwards will intersect the SW-SF-A-P (solar wind-solar flare-Atmosphere-Planetary) line at 11.6 ± 0.2 for the Ne-20/Ne-22 ratio for a 21/22 ratio of 0.031 ± 0.002 . The data set belonging to the ALHA 77215 is found to be free from experimental problems compared to ALHA 77252. The value obtained for ALHA 77252 agrees with that given above within experimental errors.

The $^3\text{He}/^4\text{He}$ value obtained in the case of ALHA 77215 is about 8.5×10^{-4} (total) and in the case of ALHA 77252 it is about 1.3×10^{-3} (total). These are the tentative values.

Further, a method to resolve the SCR-proton produced neon component from these two gas-rich chondrites is discussed briefly.

References: (1) J.N. Goswami, Nature, 293, 124, 1981.

Figure Caption: Fig. 1. Neon diagram in which the data of ALHA 77252 and ALHA 77215 are plotted. Though the Kapoeta data are plotted for comparison, they are discussed elsewhere.

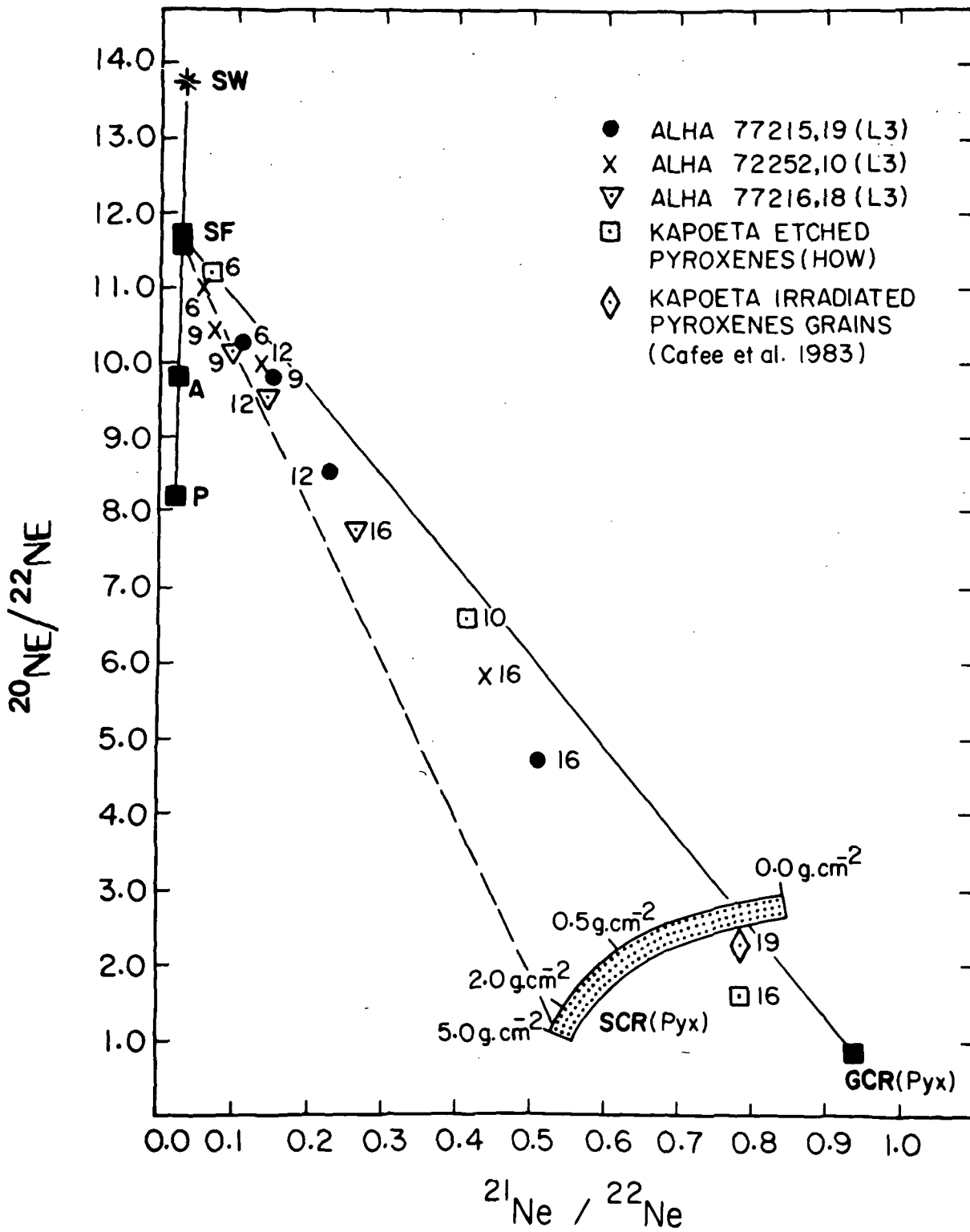


Fig.1