PESYANOE–F XENON: A NEW ISOTOPIC SIGNATURE. K. Marti and K. J. Mathew, Dept. of Chemistry and Biochemistry, University of California, San Diego, La Jolla, CA 92093, USA.

The signature of solar-type xenon was identified in the low-temperature (≤1000°C) gas release of the Pesyanoe meteorite [1]. Although the data also indicated the presence of an additional component, its identification proved to be difficult, as the heavy Xe isotopes are also affected by fission Xe [2]. The information based on the Ar isotopic abundances is limited because of the presence of a significant spallation component. Kr data permitted the identification of two distinct trapped components [3], one of solar-type, released at 600-1000°C, mass-fractionated favoring the light isotopes, while Kr in the 1700°C fraction was mass fractionated in the opposite direction. The Xe isotopic systematics were investigated again by [4], who observed fractionated Xe and Ar components (Pesyanoe-F) in another Pesyanoe chip. The fact that Pesyanoe-F xenon was revealed only at the highest temperatures (>1200°C), above release temperatures of fission Xe and radiogenic ^{40}Ar components, suggested the approach of component identification by mineral separation, if siting in enstatite is confirmed. A clean enstatite-concentrate was prepared by hand-picking of enstatite crystals, eliminating brecciated and intergrown materials.

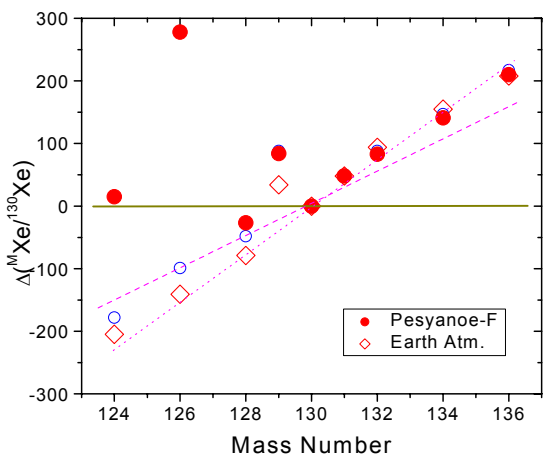

Figure 1. Xe in the >1400°C steps of the Pesyanoe enstatite separate expressed as permil deviations from SW Xe [4] (uncertainties C.L. ~25‰ for the heavy isotopes). The dotted lines represent isotopic fractionations corresponding to ^{128}Xe/^{130}Xe ratios in Pesyanoe - F and terrestrial Xe.

We report the Xe data observed in this 19 mg separate which releases a small (~5% of total) solar-type Xe component (≤1000°C) and a significant component (^{132}Xe = 58 x 10^{-12} cm^{3}STP/g) of Pesyanoe-F Xe at ≥1200°C, with a maximum release in the melting step at 1550°C. Figure 1 shows the isotopic signature of Pesyanoe-F and of a calculated "spallation-free" component. However, the relatively high concentration renders exposure age related spallation Xe unimportant (<3% for ^{126}Xe; inside error limits). As Fig. 1 shows Pesyanoe - F Xe shows a fractionation pattern of the type observed in terrestrial Xe, but differs in detail. The fractionated Pesyanoe - F signature relative to those observed in the atmospheres of planets Earth and Mars is of obvious interest.

References: [1] Marti K. (1969) *Science 166,* 1263 [2] Kim J.S. and Marti K. (1992) *PLPS 22*, 145 [3] Marti K. (1980) *Ancient Sun* 423. [4] Mathew K.J. and Marti K. (2003) Meteorit. and Planet Sci. (in press).