NOBLE GAS ISOTOPE COMPOSITION AND ELEMENTAL RATIOS IN PESYANOE AUBRITE: STEPWISE CRUSHING DATA.

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Introduction: In continuation of our efforts [1] to better understand the sources and evolution of fluid/gas phase in the Pesyanoe aubrite we studied the isotopic characteristics of noble gases in two pyroxenite lithologies (dark Px-G and light Px-B) applying stepwise crushing. The released gases have been analysed with an in-house modified noble gas mass-spectrometer VG 3600 at Heidelberg University. Pesyanoe aubrite (fell 1933, Russia) is a gas-rich polymict regolith breccia [2] consisting of several pyroxenitic lithologies, clastic and melt breccias, melt rocks, glass spherules and exotic chondrite inclusions [3]. Two pyroxenite lithologies include pyroxene grains that are rich in gas-filled inclusions.

Results: The studied lithologies differ in noble gas content: Px-G is characterized by 2.5-3 times higher primordial (Solar?) He and Ne content and ca. 50 times higher ^{36}Ar concentration than in Px-B. All noble gases reflect the presence of a cosmogenic component which is more pronounced in Px-B, where ^{21}Ne/^{22}Ne and ^{38}Ar/^{36}Ar ratios in crushing extractions vary from 0.81 to 0.88 and from 0.23 to 0.66 respectively. It is worth noting that the relative contribution of cosmogenic nuclides increase with progressive crushing. Both lithologies show well-defined correlations in a neon 3-isotope diagram pointing to a mixture between cosmogenic and another component, which in turn could represent a mixture of SW and different proportions of Ne-Q, P3 or HL components or to be subsolar [4]. In a ^{36}Ar/^{132}Xe vs ^{22}Ne/^{132}Xe diagram the data of both lithologies plot along different mixing lines pointing to a subsolar composition of one of the endmembers.

Ar isotopic composition strongly differs in both lithologies: with progressive crushing ^{40}Ar/^{36}Ar ratios increase from 280 to 800 in Px-B, but decrease from 100 to 17 in Px-G. Evidently, both lithologies experienced different magmatic and post-magmatic (including impact and irradiation) histories on their parent body. In particular, the dark lithology (Px-G) trapped a higher amount of solar type noble gases (especially Ar).

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