THE IODINE-XENON SYSTEM IN OUTER AND INNER PORTIONS OF CHONDRULES FROM THE UNNAMED ANTARCTIC LL3 CHONDRITE. A. P. Meshik[1], O. V. Pravdivtseva[1], C. M. Hohenberg[1], Yu. Amelin[2] ([1]Washington University, Physics Department, CB1105, One Brookings Drive, Saint Louis, MO 63130, USA, am@wustl.edu. [2]Geological Survey Of Canada, Natural Resources Canada, 601 Booth Street, Ottawa, ON, Canada K1A 0E8, yamelin@NRCan.gc.ca

Introduction: Alteration processes may affect I-Xe system in unequilibrated ordinary chondrites. It was shown that at the edges, where a contribution is made by matrix material around the rim, ^{129*}Xe/^{128}Xe values are generally lower (later apparent ages) than in the main chondrule mass [1]. In this work we attempted to investigate whether thermal metamorphism can affect the I-Xe system in LL3 chondrites which did not experienced aqueous alteration.

Samples: Six chondrules from the Unnamed Antarctic meteorite L3/LL3 [2] were used in this study. Typically chondrules from this meteorite have varying grain sizes and generally not mineralogically similar to each other [3]. For this reason it was not meaningful to directly compare radial Xe profiles, using laser microextraction, as was done in the case of finer grained chondrules from the Sahara 97096 EH3 chondrite [1]. Instead, we compare the average concentration of major Xe components in three original and three chondrules from which rim material (with matrix intergrowth) has been removed. All six chondrules were irradiated by thermal neutrons, with the Xe subsequently analyzed by ion-counting mass-spectrometry [4] (I-Xe chronology for these chondrules is reported elsewhere [5]).

Results and discussion: We consider three xenon components: trapped ^{132}Xe (after correction for fission Xe), radiogenic ^{129}Xe (a product of ^{129}I decay) and neutron-induced ^{128}Xe (a proxy for ^{127}I). The first two components are shown in Fig. 1. Large error bars (2σ) reflect large variation of Xe concentrations among different chondrules, especially for the non-abraded chondrules. However, the average values of Xe concentration are different with both trapped ^{132}Xe and radiogenic ^{129}Xe systematically higher in the abraded chondrules, suggesting removal of a more Xe-poor matrix. The correlation between trapped ^{132}Xe and radiogenic ^{129}Xe (iodine) suggest a common incorporation mechanism for these two volatile elements.

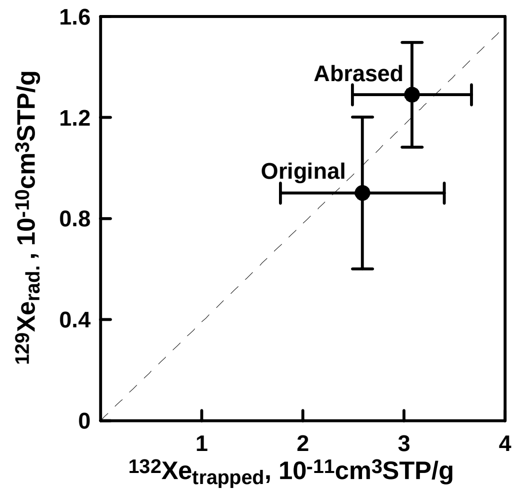

Fig.1 Average concentrations of trapped Xe (after correction for fission contribution) and radiogenic ^{129}Xe in original and abraded chondrules from the unnamed LL3 Antarctic meteorite.

Figure 2 shows the relationship between the correlated ant total radiogenic ^{128}Xe, illustrating the degree of ^{129*}Xe retention.

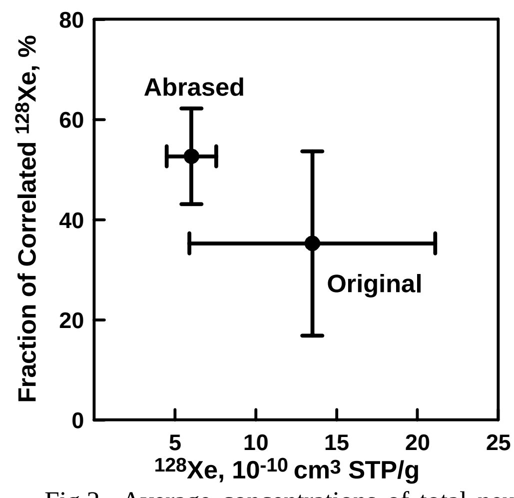

Fig.2 Average concentrations of total neutron induced ^{128}Xe and fraction of correlated ^{128}Xe in original and abraded chondrules from the unnamed LL3 Antarctic meteorite.

Here, once again, despite the large error bars, the abraded chondrules appear to differ from the non-abraded chondrules. The abraded chondrules have smaller spread in n-capture ^{128}Xe, indicating a more uniform iodine concentration, and a higher fraction of ^{128}Xe correlated with radiogenic ^{129}Xe, indicating better retention of iodine. The inner parts of the chondrule seem to preserve radiogenic ^{129*}Xe better than the outer parts which perhaps includes some intergrown matrix.

Conclusion: These results suggest that the I-Xe system in the inner parts of these chondrules seem to be more robust during thermal metamorphism in chondrules from LL3 chondrites than the outer parts, that the presence of chondrule rims may distort I-Xe chronology.

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References: [1] Whitby J. A., Gilmour J. D. and Turner G. (1998) *MAPS*, 33 (4): A167-A168, Suppl. [2] Herd R. K., Hunt P. A. and Venance K. E. (2001) 64th Meteoritical Society Meeting, Abstr.# 5367. [3] Herd R. K., Hunt P. A., Venance K. E., and Killgore M. B. (2003) *LPSC XXXIV* Abstr. # 2058. [4] Hohenberg C. M. (1980) *Rev. Sci. Instr*., 51, 1075. [5] Pravdivtseva O. V., Meshik A. P., and Hohenberg C. M. (2004) this meeting.