The isotopic composition of Xe released at different temperatures is similar to that observed in various temperature fractions of Kenna (Wilkening and Marti, 1976). The Xe-132 content is 130.2 $\times 10^{-8}$ cc/g. Our results suggest the occurrence of a single trapped Xe in Lahrauli. About 96% of Xe is released between 1000°C and 1400°C steps, indicating a retentively-sited Xe in this meteorite. The increasing Xe-132 contents in Goalpara, Havero, Kenna and Lahrauli are consistant with the decreasing shock features in these meteorites (Bhandari *et al.*, 1981).

Particle track densities were measured in several olivine crystals of Lahrauli. The average track density ρ(VH) is 1.7×10^6 tracks/cm^2. The $\rho(VVH)/\rho(VH) = 1.3 \times 10^{-3}$. Taking the exposure age of Lahrauli to be 21 m.y. and using the above data, a shielding depth of ~ 14 cm is deduced for this meteorite.

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THE MAINZ METEORITE

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In 1852 a meteorite was found in Mainz, just outside the town wall. No record of the circumstances of the find could be traced in the contemporary local newspaper. Today 42% of the original mass of 1.7 kg can be located in 13 different institutions. The largest fragment (201 g) is now in Calcutta in the Museum of the Geological Survey of India.

The meteorite was already analyzed in 1857 by Ferdinand Seelheim. A new analysis shows that the Mainz meteorite is an L-chondrite (20.8% total Fe). The only significant difference from L-chondrite chemistry found so far is the exceptional high U content of 220 ppb. This excess U was introduced during terrestrial weathering.

Because of the strongly recrystallized texture the meteorite should be classified as L6. Olivine and pyroxene composition (Fa_{24}, Fs_{20}) are within the range of L-chondrites. The feldspar composition $Ab_{81.3}Or_{7.1}An_{11.6}$ is relatively K-rich. The meteorite is highly weathered, but kamacite ($Ni_{6.5}Co_{0.95}$), taenite ($Ni_{37.9}Co_{0.28}$) and tetrataenite ($Ni_{54.2}Co_{0.19}$) were identified in the remaining metal phase. Some relict metal grains, rich in Ni, were found, indicating the preferential oxidation of Fe during terrestrial weathering. A grain of native copper (8 microns across) occurs enclosed in metal.

The Mainz meteorite has an unusual high exposure age of 50 m.y. There are only few L-chondrites with higher exposure ages. Evidence for only negligible argon loss is found in the K-Ar age of 4.26 b.y. The $^{22}Ne/^{21}Ne$ ratio of 1.07 indicates that our sample is from the interior of a larger piece. However there does not appear to be any chance to recover the rest of the meteorite, which is still buried in the ground, now within the city limits of Mainz.

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THE ON-GOING SEARCH FOR FUN INCLUSIONS

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We report on the Mg and Ca isotopic composition in two inclusions from the Allende meteorite for which there are hints of FUN characteristics. Inclusion EK25-S2-TE is a coarse-grained olivine-rich inclusion discovered and analyzed in detail by El Goresy and co-workers (Dominik *et al.*, 1978). Analyses by Clayton and co-workers (Clayton *et al.*, 1983) indicate that this inclusion has a ^{16}O excess and fractionated isotopic compositions for O, Mg and Si. Inclusion BG10a was analyzed because it showed a moderate Mg fractionation (Lee, P & W, 1978, unpublished). Becker and Epstein (1981) showed some possible hints of fractionated O and Si in BG10a. The isotopic characteristics of FUN inclusions are patterns for O and Mg which can be interpreted as reflecting dominantly mass-dependent isotope fractionation for O and Mg, accompanied by an excess ^{16}O and an effective deficit in ^{26}Mg after normalization. The hope is that inclusions with these FUN characteristics will also show more general isotopic anomalies in other elements as has been the case for the first two FUN inclusions (EK-1-4-1 and C-1). Data on Ca and Mg are shown in Table 1. Four samples of EK25-S2-TE were analyzed for Mg using the direct loading technique as well as the standard macro-techniques where Mg is chemically separated. All samples show a uniform mass fractionation of Mg of 13.6‰ amu^{-1} with a range of ± ~ 1‰ amu^{-1}. This observation confirms ion-microprobe data (Clayton *et al.*, 1983). The data presented here show the presence of a ^{26}Mg deficit of $\delta(^{26}Mg) = -0.8 \pm 0.2$‰ based on the precise analysis of fragment EK25-S2-TE-γ. Coupled with the oxygen data, this establishes EK25-S2-TE as a FUN inclusion. Inclusion BG10a shows a significant fractionation in Mg of 5‰ amu^{-1}, confirming our earlier measurements. This inclusion shows no detectable ^{26}Mg deficit; it is possible that phases with low Al/Mg may show a ^{26}Mg deficit as found for inclusion Egg-3 (Esat *et al.*, 1980). The Ca data show a definite but small mass-dependent isotope fractionation for both inclusions. The Ca fractionation favors the lighter isotopes and contrasts with the O and Mg fractionation which favors the heavier isotopes. No non-linear isotopic effects in Ca are present in either inclusion. Data on ^{46}Ca have not yet been obtained. These observations show that the presence of FUN effects in O and Mg is not always accompanied by more general non-linear isotopic effects and that this type of correlation must be considered tenuous. Measurements on Ti are expected to help establish whether these inclusions are similar to the distinct FUN inclusions EK-1-4-1 and C-1.

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Table 1

Calcium	**Δ(40/44)**	**δ(42/44)**	**δ(43/44)**	**δ(48/44)**
EK25-S2-TE	2.4 ± 0.1	0.0 ± 0.3	0.5 ± 0.3	0.3 ± 0.4
BG10a	2.4 ± 0.1	−0.1 ± 0.2	0.1 ± 0.4	0.7 ± 0.4
Magnesium	Δ(25/24)	δ(26/24)		
EK25-S2-TE-α[b,c]	14.4 ± 1.3	−0.1 ± 0.9		
-β[b]	13.5 ± 1.1	−1.0 ± 0.4		
-γ	12.5 ± 1.1	−0.8 ± 0.2		
-Int.	14.0 ± 2.2	−0.6 ± 1.2[d]		
BG10a bulk-1[c]	4.8 ± 0.6	2.2 ± 0.3		
bulk-2[e]	6.3 ± 0.8	1.4 ± 0.2		

[a]All values are given in permil; Δ values for Ca show the deviation of the absolute $^{40}Ca/^{44}Ca$ from the absolute value for normal Ca using the double spike technique; Δ values for Mg show the deviations from the $^{25}Mg/^{24}Mg$ measured directly for normal Mg. All δ values are calculated after normalization for mass fractionation ($^{40}Ca/^{44}Ca = 47.153$ and $^{25}Mg/^{24}Mg = 0.12663$). Ca data were calculated throughout using the exponential law (Russell *et al.*, 1978); Mg data were calculated using a simple power law. [b]Data obtained by the direct loading technique. [c]A bias of of +1.5‰ in δ(26/24) has been added, based on the presence of $^{27}Al^{+}/^{24}Mg^{+} \geqslant 0.5$ during the mass spectrometer run. [d]Unstable run. [e]LPW.

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