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Homogenous Fe isotope composition of chondrite leachates and residues.

Zippmann*, V. E., Wombacher, F., Elfers, B.-M., Hezel, D. C., Münker, C., * Institut für Geologie und Mineralogie, Universität zu Köln, Zülpicher Str. 49b, 50674 Köln. v.zippmann@uni-koeln.de.

Iron-peak elements like Ti and Cr display nucleosynthetic isotope anomalies of several hundred ppm on both, the planetary scale and within chondrite leachates and residues. In contrast, Fe isotopes so far display no nucleosynthetic anomalies [1,2]. In this study, we analyzed Fe isotope compositions of leachates and residues from six different chondrites at high precision, using MC-ICP-MS. Repeatability (2 sd) was ±11 ppm for $^{56}Fe/^{54}Fe$ and ±20 ppm for $^{58}Fe/^{54}Fe$, when normalized to $^{57}Fe/^{54}Fe$. Our results did not reveal nucleosynthetic Fe isotope anomalies. Only the Fe poor residue of the CM2 chondrite Cold Bokkeveld might hint at a small ^{58}Fe anomaly, which may point to the presence of presolar grains hosting Fe with s-process origin. Compared to other iron-peak elements, however, Fe isotopes are rather homogenously distributed within chondrites. This suggests that only comparitively insignificant fractions of anomalous Fe can be contained in refractory presolar phases.

[1] Dauphas, N. et al. (2008) ApJ 686, 560-569. [2] Wang K. et al. (2011) ApJ 739, L58.

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