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Genetic heritage and chronology of ungrouped iron meteorites

Spitzer*, F., Burkhardt, C., Budde, G., Kruijer, T.S., Kleine, T. *Institut für Planetologie, WWU Münster, Wilhelm-Klemm-Str. 10, 48149 Münster, fridolin.spitzer@uni-muenster.de

The fundamental dichotomy in the genetic heritage of meteorites, i.e. non-carbonaceous (NC) vs. carbonaceous (CC) materials, and chronologic studies have led to major advances in our understanding of early Solar System dynamics [e.g., 1]. The major meteorite groups studied represent a total of ~35 parent bodies. However, ungrouped meteorites might represent an additional ~150 parent bodies. Hence, we conducted a systematic study on ungrouped iron meteorites to better constrain their genetic heritage and chronology. All analyzed ungrouped irons plot on one of the two distinct sprocess mixing lines defined by the NC and CC reservoirs [2]. Their pre-exposure $\epsilon^{182}W$ values indicate that metal-silicate separation occurred between ~0.5 and ~4 Ma after formation of Ca,Alrich inclusions (CAIs). Therefore, the new data confirm the aforementioned dichotomy for an additional ~20 parent bodies and support the efficient separation of two genetically distinct source regions of planetesimals in the early Solar System. [1] Kruijer T. S. et al. (2017) PNAS, 114, 6712-6716. [2] Budde G. et al. (2016) EPSL, 454, 293-303.

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