#0063

Tantalum isotope anomalies in CV3 refractory inclusions.

Pfeifer*, M., et al. *Institut für Mineralogie, Universität zu Köln, m.pfeifer@uni-koeln.de.

Nucleosynthetic isotope anomalies in the first condensates of the protosolar nebula can shed light on the dynamics and processes inside the protoplanetary disk, can give information on its initial isotope inventory, and can verify nucleosynthetic models. Tantalum can be a sensitive tracer of distinct stellar environments because of the unique physical properties of its isotope ^{180m}Ta. Though, the very low abundance of 0.00012% makes sufficiently precise analyses challenging.

We measured for the first time the ^{180}Ta/^{181}Ta isotope compositions in six refractory inclusions from Allende and NWA 3095 (CV3). They show values from -1 to +86ε relative to terrestrial Ta, outside our external reproducibility of about ±7ε.

A possible first explanation is stable isotope fractionation, where light ^{180}Ta can be enriched by (re-)condensation, as seen for refractory elements like Ca [1]. However, the magnitude for a heavy element and the direction of fractionation seems unlikely. Thus, we interpret these anomalies as being of nucleosynthetic origin, either inherited by unmixing of pre-solar carriers or by late injection.

[1] Niederer, F.R., Papanastassiou, D.A. (1984) GCA 48, 1279–1293.

Cite abstract as:
Pfeifer, M., Münker, C., Elfers, B.-M., Peters, S.T.M., et al. (2015) Tantalum isotope anomalies in CV3 refractory inclusions. Paneth Kolloquium, Nördlingen (Germany), abstract URL: http://www.paneth.eu/PanethKolloquium/2015/0063.pdf (abstract #0063).