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Ti Isotope Heterogeneities among Chondrules

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Assessing the scale of nucleosynthetic isotope variations among chondrules can provide insights into the scale at which presolar dust was heterogeneously distributed in the early solar system. We present Ti isotope data, measured using the Neptune *Plus* MC-ICP-MS in Münster, for 20 chondrules separated from the CV3 chondrite Allende. The chondrules exhibit variable $^{50}\text{Ti}/^{47}\text{Ti}$ ratios with a total range of *ca.* 6ϵ ($1\epsilon = 0.01\%$), which we interpret to reflect variable proportions of distinct presolar components in the chondrules. Our data therefore indicate heterogeneous distribution of presolar dust at the scale of individual chondrules. The investigated chondrules fall into two distinct groups; one characterized by apparent ^{50}Ti deficits and the other by ^{50}Ti excesses (with respect to Earth). This may reflect the presence of CAI material within the chondrules having ^{50}Ti excesses, but further work is needed to test this hypothesis. Most of the investigated chondrules show apparent ^{50}Ti excesses indicating that within our sample set inclusion of CAI material is more commonly observed. We are currently in the process of obtaining Ti isotope data for additional chondrules, and are determining the bulk chemistry of the investigated chondrules.

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Cite abstract as:

Thiemens, M.M., Kleine, T., Fischer-Gödde, M. (2013) Ti Isotope Heterogeneities among Chondrules. Paneth Kolloquium, Nördlingen (Germany), abstract URL: <http://www.paneth.eu/PanethKolloquium/2013/0094.pdf> (abstract #0094).