

Triple silicon isotopes of the possible building blocks of the Earth.

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Enstatite chondrites and the Earth share similar oxygen isotopic composition and nucleosynthetic isotope anomalies for most neutron-rich nuclides (e.g., ⁵⁰Ti, ⁵⁴Cr, etc.). A recent study has reported triple Si isotopes showing a dichotomy among meteorites between chondrites and achondrites [1] different from the NC/CC dichotomy existing for all other isotopic anomalies, and a non-enstatite like terrestrial composition.

We report high-precision triple Si for bulk meteorites, refractory inclusions and terrestrial rocks. Our result show a NC/CC dichotomy and a Si isotope composition for enstatite chondrites different from that of the Earth. The Si isotopic variations are correlated with that of other nucleosynthetic isotopic anomalies in line with an initial Si isotopic heterogeneity of the solar system derived from admixing various pre-solar materials into the solar disk. However, nebular high-temperature Si isotopic fractionations could explain part of the difference between the triple Si isotope composition of the Earth and enstatite chondrites.

[1] Onyett I. et al. (2023) Nature 646:118985.

Yes, here is also space for some more speculation.
A headline will be added to the PDF after submission.
[1] Miller, H. et al. (1879) GCA 54, 345–567. [2]
Edmund, G. & Huisl, K.D. (1968) Icarus 45, 7–12.