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短寿命放射性同位体系列を用いた初期地球分化の研究
Deciphering early Earth's differentiation using short-lived isotope systematics

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Knowledge of the timescale and nature of early Earth's differentiation is central to understanding the evolution of the young Earth. Here I discuss short-lived isotope systematics of terrestrial samples that extended our knowledge of early Earth's differentiation. Recent high-precision W isotopic studies revealed positive 182W anomalies of up to 0.15 epsilon unit in ca. 3.8 Ga Itsaq rocks from West Greenland and 2.8 Ga Kostomuksha komatiites from Russia. I explored the geologic significance of the 182W anomalies by combining with trace element and other isotopic data. In this context, the W isotopic data are interpreted to reflect early silicate differentiation events on Earth. Under the assumption that the bulk silicate Earth has a 5% higher Sm/Nd than the chondrite average, the 182W-142Nd-143Nd chronometry constrains the age of the source mantle differentiation for the Itsaq samples to 4.53-4.49 Ga. The age may reflect the timing of silicate differentiation during a sequence of magma ocean solidification.

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