

Dependence of $\mu^{142}\text{Nd}$ anomalies on the choice of terrestrial standard

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$^{142}\text{Nd}/^{144}\text{Nd}$ isotope ratio is a tracer of the early differentiation of the silicate Earth. Anomalous $\mu^{142}\text{Nd}$ values, where $\mu = (((^{142}\text{Nd}/^{144}\text{Nd})_{\text{rock}} / (^{142}\text{Nd}/^{144}\text{Nd})_{\text{terrestrial standard}}) - 1) \times 10^6$, have been widely used for deciphering nature and timing of such early differentiation events. The very definition of μ assumes that the $^{142}\text{Nd}/^{144}\text{Nd}$ of the terrestrial standard is equivalent to that of the modern accessible mantle. Unfortunately, however, several recent studies have shown that the $^{142}\text{Nd}/^{144}\text{Nd}$ ratios of commonly used terrestrial standards are not identical. The same is true for other nonradiogenic isotopic ratios of Nd as well [1,2].

Our analyses of Ames Nd and JNdi-1 reveal that $^{142}\text{Nd}/^{144}\text{Nd}$ of JNdi-1 (n = 11) is 6 ppm lower than that of the Ames Nd (longterm average). Therefore, it is highly likely that a $\mu^{142}\text{Nd}$ anomaly observed with respect to one standard might disappear with the other. We did observe exactly the same while analysing alkaline rocks/TTG from India, wherein negative/zero values with respect to Ames Nd became zero/positive when calculated against JNdi-1 [Fig. 1]. Thus it is highly desirable that the terrestrial standard (and its $^{142}\text{Nd}/^{144}\text{Nd}$) be fixed uniformly. JNdi-1 appears to be a good candidate for the purpose.

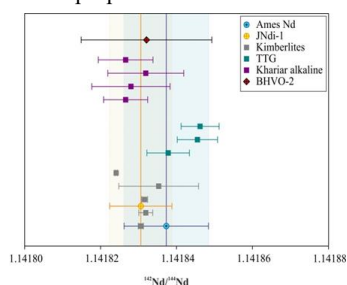


Figure 1: $^{142}\text{Nd}/^{144}\text{Nd}$ of rock standard BHVO-2, alkaline rocks and TTG. Blue and yellow lines represent average $^{142}\text{Nd}/^{144}\text{Nd}$ for Ames Nd and JNdi-1 respectively.

[1] Wakaki, S. & Tanaka (2012) *Int. J. Mass Spectrom.* **323-324**, 45–54. [2] Saji *et al.* (2016) *J. Anal. At. Spectrom.* **31**, 1490–1504