Cr isotopic search for a core component in basalts from the Ontong Java Plateau and Samoan Ocean Islands.

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Some volcanic rocks from large igneous provinces (LIPs) and from ocean islands (OIBs) are characterized by ^{182}W deficits that are well resolved from the ambient upper mantle [1, 2]. This negative ^{182}W signature has recently been proposed to originate from the outer core [3-5]. If so, the ^{182}W anomaly may be accompanied by deficits of ^{53}Cr, a decay product of a short-lived radionuclide ^{53}Mn, because Cr is more siderophile than Mn especially at high temperature [6, 7]. However, the Cr isotope compositions of LIPs and OIBs are still poorly known. Here, we report investigation of mass independent Cr isotopic variation in basaltic rocks from the Ontong Java Plateau (OJP) and Samoan OIBs. The chemical separation and purification of Cr from samples were made following the procedure described by [8]. We have measured Cr stable isotope compositions of the samples processed through the separation scheme by thermal ionization mass spectrometry (TIMS). The Cr isotope analyses yielded $\varepsilon^{53}Cr = 0.03 \pm 0.05$, $\varepsilon^{54}Cr = 0.02 \pm 0.10$ (2SE) for the OJP basalts, and $\varepsilon^{53}Cr = 0.03 \pm 0.05$, $\varepsilon^{54}Cr = -0.03 \pm 0.11 \sim 0.05 \pm 0.11$ for the Samoan basalts. The results for both the OJP and Samoan basalts reveal that there is no resolvable $^{53,\,54}Cr$ anomalies in their source mantle. Our results suggest that there's no systematical contribution to Cr isotope signatures in the source of OJP and Samoan islands from materials with anomalous Cr isotope compositions. This implies that, unlike Hf/W, the fractionation of Mn/Cr was restricted during core-mantle differentiation, or that the W isotope variations are not due to core-mantle interaction.

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