The magnesium isotope of the andesites at El Laco, North Chile

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Recently, magnesium (Mg) provide a powerful proxy to trace the recycled carbon in the deep mantle, which has been widely used to identify the recylced carbonates in the mantle sources for intraplate alkaline basalts [1, 2, 3, 4], and futhermore, crystallization of minerals does not cause the fractionation of Mg isotope in basaltic magma system [5]. There is a consensus that the andesite in continental/oceanic arc has been considered to be corrected to subducted materials. However, it is still unclear if Mg isotope fractionates during the evolution of andesitic magma system, or recycled carbonates have been involved in the petrogenesis of arc andesite.

The Pliocene andesite in the El Laco, North Chile formed in a typical continental arc setting. We conducted the Mg isotopes study on both the whole rock and the seperated clinopyroxene and orthopyroxene, respectively. The clinopyroxene and orthopyroxene have δ^{26}Mg values of -0.27‰ to -0.20‰ with an average value of -0.24‰ and -0.24% to-0.18‰ with an average value of -0.22‰, respectively. The δ^{26}Mg values of the andesites range from -0.26‰ to -0.15‰ with the average value of -0.18‰, slightly higher than that of the normal mantle (-0.25‰) [5, 6]. The heavier Mg isotopic compositions may be attributed to the a metasomatismed source modified by the heavy Mg-rich materials or the disgassification during the eruption. Moreover, Our results show Mg isotopic fractionation between the clinopyroxene and orthopyroxene and whole rocks, which is very different from the basaltic systems. As both the clinopyroxene and orthopyroxene show slightly lower δ^{26}Mg values than the whole rock, some mineral(s) enriched in heavier Mg should exist in the andesite.

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