Subcontinetal lithospheric mantle origin of the Cenozoic kamafugite in western Qinling, China: Evidence from helium isotopes in mantle-derived xenoliths

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The kamafugite with ages of 18-23 Ma locates in Lixian area in southern Gansu province, China (West Qinling in terms of tectonic unit). The origin of the volcanics was explained to be an enriched mantle, or even related to mantle plume origin [1, 2]. We present here new He isotopic data arguing for a enriched subcontinetal lithospheric mantle origin, instead of any relationships to mantle plume. Helium isotope data of olivine and pyroxene in mantle-derived xenoliths hosted in the volcanics yielded ^{4}He in the range of $(0.45\text{-}24)\times10^{-9}$, and R/Ra=0.59-6.22, these data are similar to that of the mantle-derived xenoliths in NE and E China [3], which showing a typical subcontinental lithospheric helium signature. Most of them are radiogenic associated with low helium content. Because the host rocks and xenoliths are both enriched in LREE, Rb, Ba, Th, U, Nb, and Ta, the radiogenic signature represent a post-eruption phenomena due to U and Th decay. He, along with Sr-Nd-Pb-O data, indicates an OIB-like, enriched mantle component plus a depleted asthenospheric source should have been responsible for the origin of the kamafugite in west Qinling.

Reference

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