Ne isotopic study of HIMU; new evidence for recycling

Takeshi Hanyu[1]

[1] JAMSTEC/IFREE

New He-Ne-Ar isotope data for Polynesian HIMU basalts are presented. Olivine samples show various 21Ne/22Ne ratios from atmospheric value (0.029) up to 0.034, while they have almost constant 20Ne/22Ne ratio that is indistinguishable from atmospheric ratio (9.8). 21Ne/22Ne ratios are well correlated to 40Ar/36Ar ratios which vary from atmospheric value (269) up to approximately 2300. In the 21Ne/22Ne-20Ne/22Ne diagram, the HIMU samples define almost horizontal trend that are distinct from the MORB and other OIB trends. This horizontal trend is best explained by mixing of modern atmosphere and the nucleogenic component, which is the product of atomic reaction between oxygen and energetic alpha particles emitted by decay of U and Th. This suggests that the HIMU endmember has possessed elevated (U+Th)/Ne ratio. This fact is consistent with the previous model that the HIMU was originally a recycled subducted slab material because such material should be depleted in noble gases rather than in U and Th during subduction. Elevated 40Ar/36Ar in the HIMU endmember is also accounted for by the same process; Ar was more mobile than K, that is parent element of 40Ar, during subduction.