# Rb-Sr and Sm-Nd isotopic systematics of the Kurose mantle xenoliths from the southwest Japan arc

# Masako Yoshikawa[1]; Shoji Arai[2]

[1] BGRL, Kyoto Univ.; [2] Dept. Earch Sci., Kanazawa Univ.

Cenozoic volcanism of the southwest Japan arc has following characteristics, (1) extensive alkaline volcanism which is consisted with monogenetic volcanic groups, (2) voluminous andesitic volcanism restricted to the back arc side and (3) no observation of the Wadati-Benioff zones of the Pacif and Phillippin Sea plates (Takamura, 1973; Sugiura and Ueda, 1973, Yoshii, 1973, Iwamori, 1991, 1992). From these geological and geophysical characteristics, many petrological and geochemical studies have been accumulated to understand the magma generation process. As the results, it has been suggested that the Cenozoic alkaline magmas in the SW Japan have been derived from mantle plume, of which the chemical composition was affected by fluid with volatile and incompatible elements (Nakamura et al., 1986; Iwamori, 1991, 1992). Recently, however, Tatsumi et al. (2005) inferred that the mantle plume of the SW Japan arc had rather depleted isotopic signature on the bases of the comprehensive data set including mineral compositions, major and trace element compositions and Sr-Nd-Pb isotopic ratios of volcanic rocks from the Cheju Island. Thus, it has been controversial issue that the chemical and isotopic structure of upper mantle beneath the SW Japan arc and origin of the enriched component. These alkaline basalts frequently contain mantle xenoliths (e.g. Takamura, 1973; Aoki, 1987). Petrological, petrographical and isotopic researches of these mantle xenoliths suggested that the upper mantle beneath the SW Japan arc were heterogeneous (e.g. Kaneoka et al., 1978; Arai and Kobayashi, 1981). Recently, Arai et al. (2000) indicated that these mantle xenoliths could be divided into two types, unmetasomatized (Kurose) type and metasomatized (Aratoyama) type. It was inferred that the latter type is metasomatized by alkali basaltic melts which was concerned with asthenospheric upwelling in the Miocene time (Arai et al., 2000). Therefore, it is suitable to obtain the geochemical and isotopic information of upper mantle beneath the SW Japan before opening of the Japan Sea.

Geochemical and isotopic compositions of the mantle xenoliths under the Japan arc including the Kurose mantle xenoliths were investigated by several scientists (Kaneoka et al., 1978; Kagami et al.,1993; Abe et al. 1998; Nishio et al 2004, Abe and Yamamoto, 1999). Kagami et al. (1993) observed regional variation in Sr and Nd isotopic compositions of them and similarity of isotopic compositions of the Cretaceous felsic igneous rocks. Abe et al. (1998) obtained the trace element compositions of clinopyroxenes in mantle xenoliths from the NE and the SW Japan arcs. They inferred that these xenoliths suffered various degree of metasomatism originated from island arc magma or magma derived from plume which is responsible for opening of the Japan Sea. On the basis of an extremely low 7Li value from mantle xenoliths in the SW Japan, Nishio et al. (2004) proposed that metasomatic agent was derived from subducted highly altered basalt. Abe and Yamamoto (1999) determined Rb-Sr isotopic systematics of whole rocks and their constituent minerals of the Kurose mantle xenoliths. They inferred that the metasomatism or partial melting with metasomatism was occurred around 1, 3 and 5 Ga ago. From these researches, it was presumed that Kurose xenoliths recorded several metasomatic events. However, origin of each metasomatic agent is unclear because of insufficient isotopic information. Thus, we determined the Rb-Sr and Sm-Nd isotopic systematics of separated minerals from the Kurose mantle xenoliths to understand origin of the metasomatic agent, and isotopic and chemical evolution of upper mantle beneath the SW Japan arc.