Picrite lava flows occur in the Kumejima Island, central Ryukyu arc, southwest Japan. The picrite is ca. 2.5 Ma old, composing subareal lava flow units of several tens of centimeters to several meters thick. Bulk rock composition and mineral chemistry suggest that picrite with MgO contents of 16.5 wt% and SiO2 contents of 49.6wt% may represent the primary magma derived from depleted mantle peridotite.

We carried out piston-cylinder melting experiments on the picrite utilizing graphite-platinum double capsule method. Coexistence of olivine and orthopyroxene near the liquidus occurred at 1.1-1.2 GPa and 1390-1400 C. Although the graphite-platinum double capsule method gives ca. 3.3 log unit lower oxygen fugacity compared with Ni-NiO buffer conditions at those temperatures (Medard et al., 2008, Amer Min), the difference of the oxygen fugacity may not cause large departure of the olivine and orthopyroxene saturation conditions of the picrite. MELTS program of Ghiorso & Sack (1995, CMP) suggests that the equilibration conditions may decrease by ca. 0.1 GPa and 15 C from the experimental conditions. So we suggest that the primary picrite of Kumejima was formed at ca. 1.0-1.1 GPa and 1375-1385 C. These conditions correspond to ca. 1480 C of potential mantle temperatures of McKenzie and Bickle(1988, JP), suggesting ca. 150 C higher MPT compared with MORB generation. Such high MPT implies mantle upwelling and active back-arc spreading of the Okinawa trough ca. 2 Ma.

Key words: picrite, Kumejima, mantle potential temperatures, active back-arc spreading

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