Korean Journal of Polar Research
Vol. 7, No. 1/2, pp. 92, December 1996

The Microarea $^{40}Ar/^{39}Ar$ Isochron Age of A635 Basalt from North Coast of King George Island of Antarctica, by Laser Mass Spectrometer

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Laser used directly on polished thin section for microarea melting and high-sensitivity and high-precision mass spectrometer have been applied to $^{40}Ar/^{39}Ar$ dating in recent years (Dalrymple and Duffield, 1988; Dalrymple, 1994; York *et al.*, 1981). On the basis of chronological and petrological studies a microarea $^{40}Ar/^{39}Ar$ age of A635 basalt sample has been measured and published here. The basalt sample collected from the north coast of King George Island is with a porphyritic texture, of which the main phenocryst is euhedral labradorite and the matrix component is mainly microcrystalline plagioclase and pyroxene.

A $6 \times 6 \times 2$ mm polished section was put in the E-5 tunnel of the reactor 902 for irradiating 50 hours and melted by a continuous (cw YAG) device. A high gain electronic signal apparatus attached to the MM-1200 mass spectrometer was used to measure the argon isotopes. The sample was heated to 1,500°C by the laser beam with the diameter of 20μm from a Nd: YAG solid laser. The peak values of argon isotopes were measured by a 17 cascade high gain electronic signal apparatus, and age was calculated with a constant $\lambda^{40}K = 5.543 \times 10^{-10}/a$.

Four microareas on the section of A635 basalt sample were selected for full fusion on laser-mass spectrometer analysis and yielded the apparent ages of 445.3 ± 0.4Ma, 155.8 ± 0.1a, 162.8 ± 0.2Ma and 210.4 ± 0.5a, respectively. An isochron age 54.2 ± 1.1Ma was obtained by plotting above four $^{40}Ar/^{39}Ar$ data and the slope of isochron line is A = 0.9621.

The microarea $^{40}Ar/^{39}Ar$ isochron age dated by laser mass spectrometer is a reasonable value which confirms that the forming age of A635 sample is Tertiary, same as those of the volcanic rocks outcropped on the north coast and other places, and the volcanic rocks become younger and younger from southwest to northeast along the north coast of King George Island. In other hand, this value is far lower than those of the four apparent ages implying sample contains excess argon. The isochron age itself also confirms that the deviating high value of K-Ar dilute age must be caused by excess argon. Therefore, geologist and geochronologist should carefully accept and explain those K-Ar apparent ages since the inhomogeneous of K and Ar in the sample and existence of excess argon even in Cenozoic basalt.

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