

**New K-Ar dating system of the Korea Basic Science Institute:
System outline and analytical results**

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A new Ar isotope analytical system of Korea Basic Science Institute has been constructed and calibrated. The system mainly consists of VG5400 mass spectrometer, gas preparation system, and resistance furnace. The mass spectrometer is a magnetic sector type analyzer with 90° extended geometry ion optics and 54 cm dispersion length. The source is Nier type operated at an accelerating potential of 4.5 kV and trap current of 200 μ A. Two collectors are installed: a High Faraday cup for the larger amounts of ion, and electron multiplier for low-intensity ion beam. The mass resolutions reach 200 and 600, respectively. The sensitivity of the mass spectrometer is about 1.56×10^{-12} mol/V and its background is 1.34×10^{-18} mol for ⁴⁰Ar. The procedural blank is less than 4.46×10^{-14} mol for ⁴⁰Ar and has nearly an atmospheric composition.

The resistance furnace heats the samples of 15 - 50 mg wrapped with 15 μ m thick Al-foil at 1500 °C in the tantalum crucible. Ti-sponge furnace, LN₂-cooled cold trap, and two Sorb-AC getters purify the extracted gas added with the exact amounts of ³⁸Ar spike in the gas preparation system. The purified gas is introduced into mass spectrometer and the isotopic ratios of argon isotopes are measured by peak jumping methods.

Potassium analysis is carried out by atomic absorption spectrophotometer (Unicam 989) using a 2000 ppm Cs buffer. Samples are decomposed with mixed acids in a Savillex teflon vials, and analytical accuracy and reproducibility are within 3 %.

The age-known LP6 (128.5 ± 6 Ma) and Baba (11.6 ± 0.4 Ma) biotites are analyzed. The obtained ages are 125.28 ± 0.25 Ma and 11.43 ± 0.23 Ma, respectively, which agree well with the recommended values. The K-Ar age of the coarse-grained muscovite and biotite from the Precambrian pegmatitic granite in Chunyang-Yeongwol area are obtained. The age changes systematically from 1383.1 Ma to 165.6 Ma towards the Mesozoic Yeongju granite that has the K-Ar age of 150.8 Ma (muscovite) and 185.4 Ma (hornblende). The broad K-Ar age spectrum of Precambrian muscovites reflects the wide thermal effects of the Mesozoic granite.

The installed system is sufficiently useful for K-Ar dating of samples older than 5 Ma. For the wide application, the sensitivity method for young samples of less than 1 Ma and ⁴⁰Ar/³⁹Ar method are being investigated.