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The ARGUS multi-collector mass spectrometer

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ARGUS is a static vacuum gas-source multi-collector mass spectrometer specifically designed for argon isotopic analyses. The source is configured to focus in both Z and X axes and has a measured sensitivity of 1.35x10^{-3}A/torr at 200 μA trap. Five precisely inter-calibrated Faraday collectors are configured to simultaneously collect data for ^{36}Ar through ^{40}Ar. Each collector is fitted with a 10^{-12} ohm resistor, except the collector used for ^{40}Ar detection (high 2 position) that has a 10^{-11} ohm resistor. The analyser background contains 1.5x10^{8} atoms ^{40}Ar (n=10).

A standard 15 minute analysis (20 cycles) of our air standard achieves a precision of 0.2% on a 2.85 V ^{40}Ar signal (10^{-11} ohm resistor) and 0.4% on a 9.4x10^{-3} V ^{36}Ar signal (10^{-12} ohm resistor). In a single analytical period of 28 air calibrations, ^{40}Ar and ^{36}Ar signals (same signal sizes as above) display an overall variation of 0.1%, while the average ^{40}Ar/^{36}Ar (300.6 $\pm$ 0.3) has a similar degree of uncertainty. Inter-comparison of co-irradiated mineral age standards has been performed and ages calculated relative to Taylor Creek Rhyolite sanidine (28.34 Ma; Renne *et al.*, 1998). Argon was released in a two-step heating schedule using a CO_2 laser; a low-power degassing step was followed by a high-power fusion step (used for all age determinations). Multiple determinations of Alder Creek sanidine yield an average age of 1.193 $\pm$ 0.005 Ma (n=57) that overlaps the accepted age of 1.193 $\pm$ 0.001 Ma (Nomade *et al.*, 2005).

The highly-reproducible ^{40}Ar/^{36}Ar ratios from analysis of routine air calibrations and ^{40}Ar/^{39}Ar ratios from dating of ACs indicate that the Argus instrument is capable of

yielding high-precision data.