# Performance of the Helix-MC multi-collector mass spectrometer - resolution of argon isobaric interferences

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Analyses of noble gas isotopes by multi-collector mass spectrometry substantially improve measurement precision and accuracy, with the potential to revolutionise applications to cosmo- and geo-sciences. Mass resolution and mass resolving power on the H2, Ax and L2 detectors of the Helix-MC noble gas mass spectrometer installed at the Australian National University are approximately 1,800 and 8,000, respectively. The high mass resolution of the L2 collector permits complete separation of the $^{36}Ar$ peak from isobaric interferences $^{12}C_3$ and partial separation of $H^{35}Cl$. By adjusting the L2 collector position, interference-free $^{36}Ar$ isotope analyses have been achieved.

From a MD-2 biotite standard (collected from the GA1550 Mt Dromedary site), we observed beam intensities for $^{40}Ar$, $^{36}Ar$, $H^{35}Cl$ and $^{12}C_3$ of 4826, 0.775, 0.027 and 0.024 fA, respectively. Corresponding $^{40}Ar/^{36}Ar$ and $^{40}Ar/(^{36}Ar + H^{35}Cl$ and $^{12}C_3)$ ratios are 6,452 and 6,054, respectively. It is noted that a significant fraction of $H^{35}Cl$ released from MD-2 could not be completely removed by purification procedures, and this interference cannot be corrected by blank subtraction. It is stressed, however, that the very high proportion of radiogenic $^{40}Ar$ to total $^{40}Ar$ released from MD2 biotite means that the correction of atmospheric Ar using either $^{36}Ar$ or the combined $^{36}Ar + H^{35}Cl$ and $^{12}C_3$ peak, influences the estimation of radiogenic $^{40}Ar$ by <0.3%. On the other hand, when $^{40}Ar/^{36}Ar$ ratios in samples, such as young basalts, are close to the atmospheric value, corrections for atmospheric $^{40}Ar$ using interference-corrected $^{36}Ar$ become more significant.