Collision cell MC-ICPMS

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MC-ICPMS has revolutionised isotope ratio mass-spectrometry but remains critically limited in some applications as a result of spectral interferences. Isobars from common plasma gas species and matrix elements during laser ablation can present a major challenge to exploiting the full potential of MC-ICPMS. Collision cells offer an ability to minimise this persistent problem. Conditions within the collision cell can be set to remove interferences by destruction of molecular ions, charge exchange or preferential reaction to form new species with different masses. Yet, collision cells have largely been in the domain of quantitative trace elemental analysis, used to generally improve signal to noise rather than in isotopic work, where specific reactions schemes can be carefully tailored to the individual isotope system under investigation. A collision cell was used as an intrinsic focussing element in an early MC-ICPMS design. However, full flexibility to adjust optimally a collision cell requires that it is independent from the main mass analyser. We will present the development of "Proteus", an instrument designed to thus incorporate collision cell functionality into isotope ratio mass-spectrometry. We have coupled components from the Thermo Fisher Scientific iCAP Q with the Thermo Fisher Scientific Neptune Plus. We have been able to marry this low energy introduction system to the isotope ratio analyser without dramatic loss in transmission and maintain isotope ratio stability within the specification of the Neptune. We will demonstrate the capability of the collision cell in removing major interferences and further expound on the design concept behind the instrument and the additional possibilities it offers. The use of a laser ablation introduction system with the Proteus promises to push the envelope of *in situ* isotope ratio measurements.