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Evolution of in-situ Rb/Sr by LA-MC-ICP-MS/MS: from *Proteus* to *Neoma MS/MS*

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The introduction of ICP-MS/MS instrumentation in the last decade, such as the Thermo Scientific™ iCAP-TQ™ and Agilent Technologies™ 8800 and 8900, has seen new analytical methods developed. One method which has seen much interest is *in-situ* Rb/Sr dating by laser ablation [*e.g.,* 1,2]. However, Rb/Sr dating is a technique which traditionally benefits from the significantly higher isotope ratio precision which can be achieved by multicollection, such as in MC-ICP-MS or TIMS. This naturally led to the conclusion that for this application what was required was an instrument combining the excellent precision of isotope ratio measurements from MC-ICP-MS with the full analytical versatility of established ICP-MS/MS designs.

In-situ Rb/Sr dating has been reported for two prototype MC-ICP-MS/MS developed by Thermo Fisher Scientific™: *Proteus* MC-ICP-MS/MS and *Vienna* MC-ICP-MS/MS. The *Vienna* MC-ICP-MS/MS was built upon the experiences collected from the preceding Thermo Scientific *Proteus*, borne from a cooperation between the University of Bristol and Thermo Fisher Scientific, introducing a groundbreaking, novel pre-cell mass filter design [3]. Both Proteus and Vienna were highly successful for in-situ Rb/Sr analysis, providing a hundred-fold increase in sensitivity and 25 times improvement in $^{87}Sr/^{86}Sr$ precision over single collector ICP-MS/MS instrumentation [4].

Here we report on the analysis of in-situ Rb/Sr using the new Neoma MS/MS MC-ICP-MS, an upgrade option for the latest Neoma MC-ICP-MS platform. The larger detector array, wider dispersion, seamless laser-instrument software integration, all combined with its unique MS/MS technology: the Neoma MS/MS dramatically improves precision and accuracy of in-situ Rb-Sr, revolutionizing in-situ geochronology.

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