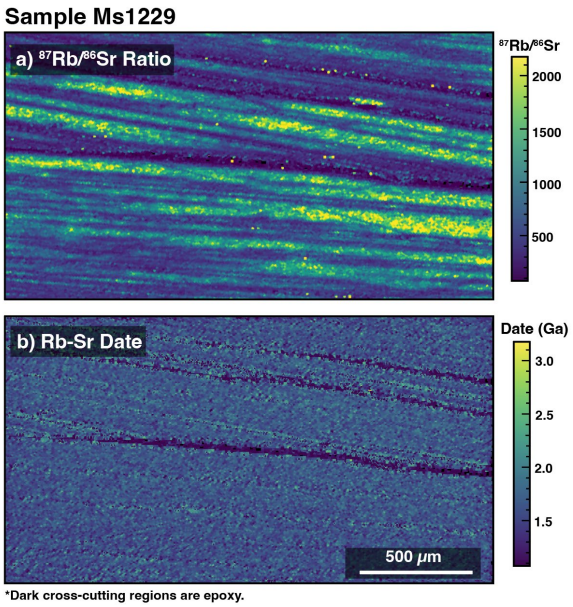
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High Speed Rb-Sr Mapping of Micas by LA-ICP-MS/MS

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Recent advances in tandem mass spectrometry (ICP-MS/MS) have facilitated *in situ* Rb-Sr dating of micas and feldspars. Combined with developments in laser ablation fast washout cell technology, this enables high-speed LA-ICP-MS/MS mapping of micas for Rb-Sr geochronology. Previous work on Rb-Sr mapping has been performed at washout times (single pulse response) of ~85 ms [1]. In this study, we take advantage of the low-dispersion TV3 ablation cell from ESI to conduct date-mapping experiments at single-pulse response times <20 ms. We first determined that reaction cell parameters such as axial acceleration, SF_6 gas flow rate, and wait time offset have minimal impact on single pulse response times. High-speed Rb-Sr date maps were acquired using an ESI imageGEO193 excimer laser equipped with a TV3 large-format cell coupled to an Agilent 8900 ICP-MS/MS. We employed a 5×5 µm spot with a scan speed of 132 µm/s and a repetition rate of 263 Hz at 3 J/cm². Maps of well-characterized biotite and muscovite reference materials were collected alongside a potential new reference material from Drömgruvan, Östergötland County, Sweden (Ms1229) and processed in iolite4 using the DRS of [2]. Date maps of the biotite reference materials were age-corrected to the LaPosta biotite; biotite maps of MD4B (Mt. Dromedary), Shap granite, and McClure Mountain are consistent with known ages. The date map of Ms1229 was age-corrected to muscovite reference material WCM-1 and gives an average date consistent with the spot-based date of 1734 ± 5 Ma. Additionally, we developed iolite4 plug-ins to produce age maps directly within the iolite4 framework. Future work will include characterization of micas that have undergone multiple deformational events.



*Dark cross-cutting regions are epoxy.