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Beta testing: Debugging *in situ* Rb-Sr, K-Ca, and Lu-Hf geochronology

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The recent proliferation of *in situ* beta-decay geochronology methods has opened new lines of geological investigation at scales not previously feasible. As with any developing methodology, ever more detailed studies have highlighted a broad array of challenges to be understood and mitigated. Over the past 10 years, the community has been working through the identification of optimal reaction gases, complications of non-matrix-matched primary reference materials, detector cross-calibration, specimen orientation effects, consequences of working with the ‘mean of ratios’ versus the ‘ratio of means’, uncertainty propagation, and data reduction/post data reduction schemes, to name but a few issues. In sum, this work has demonstrated the robustness of *in situ* LA-ICP-MS beta-decay geochronology and has set the foundation for future directions that will allow further exploitation and development of the methodologies as our understanding and available instrumentation continue to evolve.