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Geoscientific Instrumentation Methods and Data Systems Discussions

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Interactive Comment

Interactive comment on "Alkali element background reduction in laser ICP-MS" *by* C. W. Magee Jr. and C. A. Norris

Anonymous Referee #2

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Review of Magee & Norris: Alkali element background reduction in laser ICP-MS - Submitted for publication in Geoscientific Instrumentation, Methods and Data Systems

General comments: This is an interesting, albeit brief, manuscript that reports on systematic experiments aimed at reducing background levels of the notorious alkali elements in LA-ICPMS. This is highly relevant since the most commonly used standard for instrument tuning and external standardization is a high-Na glass, which potentially contaminates the instrument with easily ionizable alkali-elements, most notably Na, making their low-level analysis near impossible. The authors report on results of standard measures such as segregating cones for different usages, which they admit are rather straightforward. However, their main contribution is the presentation of a

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custom-made, virtually Na-free (relative to conventional glasses) homogenous glass standard. Its performance relative to the conventional ones forms the main results section. Overall, the paper merits publication, however, several aspects, especially the results/discussion parts, could be improved, as follows. It would be great if towards the end some mention is made where / how these glasses are being made available. They would be of great interest to the community.

Specific comments: 1) P4, L9: Insufficient details are provided for the LA-ICPMS section. No information is given on the cell gas, cell type, laser fluence (25% mirror is insufficient), ThO/Th, U/Th, RF power etc. to name but a few. This might be best placed into a short table. 2) P4, L29: In view of the updated Jochum et al (2011) NIST61x dataset, it's surprising to see Pearce et al (1997) to be used in 2014 still. 3) Tab. 4b & P5+6: Not enough is made of the fact that the background levels, using the alkali-poor glass, from Aug. 2006 onwards vary remarkably much, not only over time (e.g. for Na almost 200x between 10-Aug and 18-Sep) but also during a single day. Regarding the latter, a nearly 100x fold decrease is seen on 18-Sep, followed by a >30x-fold increase on the same day, assuming these data are in sequence. These large (Na) background variations much be mentioned and explained, e.g. in the context of type of sample material analyzed that day etc. Are such variations seen because NIST61x were used during those days nevertheless given their importance as external standard? Does Na bg become low again with cleaned cones? 4) What is the availability of these glasses? Even if they are not fully standardized, they would still be very valuable as tuning material for the community! 5) Figures: I'd suggest that some figures would benefit from y-axes with breaks in scale, such that the variability is better displayed and not dominated by few high outliers, e.g. Fig. 1b, 1c, 1d. Or a zoomed-in close-up near-zero or indeed logarithmic scaling.

Minor corrections (not necessarily comprehensive): P4, L3:kV not keV, as accelerating voltage in EMPA. P4, L22: hrz? Hz. P5, L16-19: There is a wording problem somewhere in this sentence and verbs etc appear to be missing. P1, L3: . . .Sciences; The

GID
4, C254–C256, 2014

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GID

4, C254–C256, 2014