



Interactive comment on “A spectral library for laser-induced fluorescence analysis as a tool for rare earth element identification” by Margret C. Fuchs et al.

Margret C. Fuchs et al.

m.fuchs@hzdr.de

Received and published: 15 June 2021

Response to reviewer's comments

Interactive comment on “A spectral library for laser-induced fluorescence analysis as a tool for rare earth element identification” by Margret C. Fuchs et al.

Uwe Altenberger (Referee) uwe@geo.uni-potsdam.de

Received and published: 8 January 2021

Response to general evaluation:

C1

Thank you very much for this positive feedback and your recommendations! We are currently working on several additional aspects concerning efficient technical solutions as well as testing applications to further mineral hosts and their respective geological settings. We also test further integrations of optical technologies to take full advantage of their benefits and use complementary information (e.g. already was published by Lorenz et al., cited in this manuscript). Integrative solutions may also address the quantitative dimension. However, this will demand for smart solutions to keep industrial applications realistic and add value to existing technologies by providing a non-invasive, ecologic and economically efficient alternative for exploration operations.

To be checked/corrected

Abstract: line 3 I would add ...and minerals tosuch as rocks. . .

ok, we added “Applications to natural materials such as minerals and rocks . . .”

p. 2 line 64: ..are instead of is?

Unfortunately, we cannot find a matching phrase for this comment. We changed the sentence originally on p. 3 l. 61-64 and separated into two to hopefully make the meaning more clear: “Nevertheless, the availability of new, sophisticated, automated data processing routines emphasises already today the need for digital reference data of complete spectra, comparable to those for HSI (e.g. Kokaly et al., 2017) or Raman spectroscopy (e.g. Lafuente et al., 2015). Such reference data are crucial to further develop and automate the LiF-based REE detection and analytical capacities for analyses of REE abundances and their spectral representation in natural rocks.”

p.4: line 42/43: ... multiplied by 0. I am not sure if 0 is ok

We assume that the comment refers to p. 6 line 125, where the multiplication by zero applies to the first data point of the merge segment only. For further data points, the weighting factor linearly increases to one across the merge segment to gradually transition from the first to the second spectrum. This allows for a smooth merge without

C2

artificial steps in the spectra which could corrupt analytical detection methods. So mathematically, the multiplication with zero is ok, but we acknowledge that the formulation was somewhat complex. Thus, we suggest the following new formulation: "Within the merge segment, the final spectrum transitions smoothly from the first (measured with 334 nm long-pass filter, covering the short wavelength range) to the second partial spectrum (measured with 550 nm long-pass filter covering the long wavelength range). Mathematically this means, that the difference of the partial spectra multiplied by a linearly varying weighting factor from zero to one across the merge segment is added to the first spectrum. Finally, the partial spectra were ..."

Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2020-296>, 2020.