

Interactive comment on “MIMiX: A Multipurpose In-situ Microreactor system for X-ray microspectroscopy to mimic atmospheric aerosol processing” by Jan-David Förster et al.

Anonymous Referee #1

Received and published: 22 February 2020

General comments.

The manuscript presents instrumental details and some demonstrations of a microreactor that can fit inside a STXM/NEXAFS apparatus to enable X-ray microspectroscopy studies under a wider range of environmental conditions than are usually present for STXM. The ability to control temperature is a very nice addition to this area of the field. This is a very clear manuscript that communicates the capabilities of the technique well. However, I recommend the addition of details to the text that provide context for some of the time-scales and other limitations of these experiments. I recommend this for publication in AMT after the following minor comments are addressed.

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Minor comments

1. Emphasis is placed on the low profile in the front enabling C K-edge analysis. Is there sufficient room to enable S K-edge as well? If not, what aspect is limiting this?
2. It is noted that “We could not detect any carbonaceous contaminants from potential outgassing of the O-rings, from the lubricant or from the glued components”. Under what systems was this probed? Was it only for the systems shown in the manuscript or have a broader range been tested? I am specifically concerned about the glue and any fumes that could end up partitioning into organic aerosol particles.
3. On page 11 you state: “This deviation might be attributed to the presence of the silicon nitride substrate but likely is a result of the hysteresis of the sensor, which was operated under fairly extreme conditions here and needs a long time to equilibrate after operation close to saturation conditions”. How long is a “long time”? What are the typical time scales for these experiments and what else (if anything) limits the time scales (aside from the length of time it takes to raster scan and collect the spectrum)?
4. For the isoprene experiment, how quickly was the system cooled? How much variation in this cooling rate do you have? What about for warming rates? Is there any equilibration time needed between cooling and warming cycles?
5. For the isoprene study did any other particles nucleate ice? How wide of a field of view is possible with this apparatus? Can you still do larger scan areas to enable a search for “exemplary” particles? Are there any limitations to this in the current design?
6. How long is a typical experiment for both RH only and the ice nucleation studies (T and RH varying)?
7. Some of the font sizes in the figures are rather small and difficult to read. I particularly recommend improvements in Figure 1 and the axis on Figure 4 (the pale colors are very hard to read when printed in black and white).

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