

Interactive comment on “Quantitative capabilities of STXM to measure spatially resolved organic volume fractions of mixed organic/inorganic particle” by Matthew Fraund et al.

Anonymous Referee #3

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This review pertains to the manuscript titled “Quantitative capabilities of STXM to measure spatially resolved organic volume fractions of mixed organic/inorganic particles” submitted to the journal, Atmospheric Measuring Techniques. The authors investigated the capability of STXM to quantify the Organic Volume Fraction (OVF) in particles composed by sodium chloride and sucrose and particles composed by ammonium sulfate and sucrose at several inorganic/organic fractions. They use X-ray microscopy and spectroscopy to quantify the OVF of the samples indicated above. They found that STXM can predict fairly well the OVF of aerosol particles when the density is known.

This study is of great importance and it has been done properly and systematically.

C1

This follows the journal guidelines of laboratory measurement techniques for the constituents and properties of atmospheric aerosol particles. The manuscript is timely and fits within the scope of the journal. I recommend the manuscript to be published in Atmospheric Measuring Techniques only after responding to the major and minor comments below.

Major Comments:

1. Why did the authors centered the study in calculating the OVF instead of the Organic Mass Fraction? If the Mass Fraction will be considered, the results are not affected by the density of the organic material. To this reviewer the capability of STXM of calculating the OVF heavily depends on the knowledge of the density of the organic fraction.
2. I. 17-19 page. 9 Why didn't the authors check for contamination of carbonate? Carbonate is easily detectable in the C K-edge region (clear feature at around 290 eV).

Minor Comments:

1. In the abstract it must be indicated that the measurements are done in the K-edge of carbon (maybe even specify the energies used). Otherwise it looks unclear to the reader and it can create confusion.
2. How sure are the authors about the composition of the solution being the exact same composition as the average composition of the particles? (I. 19 and 20 page 7)
3. Why didn't the authors include measurements in any other region of the spectrum apart of the Carbon K-edge?
4. I.30-32 page 10. Why didn't the authors look at chloride or sulfur edge to define better the particle edge in the case of such as problems with that?
5. The characterization of the OVF in atmospheric aerosol particles will be affected by the fact the volatile fraction of organics will evaporate in the STXM chamber in the vacuum. Could the authors comment on that?

C2

Technical comments I. 21 and 22, page 2: Why to specify “previously”?

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-351, 2018.