

***Interactive comment on “High humidity tandem differential mobility analyzer for accurate determination of aerosol hygroscopic growth, microstructure and activity coefficients over a wide range of relative humidity” by Eugene F. Mikhailov and Sergey S. Vlasenko***

**Anonymous Referee #1**

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General comments:

This paper presents a description of a HHTDMA and related method developed for investigating the hygroscopicity of aerosols in RH range of 2-99.6% with the uncertainty of growth factors within 0.9%, which will help explore the interaction between water and aerosols at RH close to 100%. By combining the restructuring modes with hydration/dehydration modes, the GFs can be measured in high precision after the mi-

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crostructural rearrangement effect is considered. The manuscript is well written and presents a valuable contribution in the field of aerosol measurement techniques. I recommend this manuscript to be published after the following issues to be addressed and modified.

Specific comments:

Section 2.1: The manuscript gives a general description about the design and the components in constructing the HHTDMA. However, temperature and humidity control should be critical issues in operation, for example, maybe a PID control program was used with the input of RH4 and RH5 probe to control the RH in DMA2 precisely. How did the GORE-TEX membrane work? How to adjust the rotation speed of the fans in the DMA2 box? Has the temperature gradient in DMA2 column been estimated? More details about the humidity and temperature control of the second DMA would be better.

Page 13, Line 358-360: This sentence is obscure and should be rewritten.

Page 16, Line 470-480: I recommend providing more proofs (e.g. SEM images of particles) or reference(s) to support this claim.

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-478, 2019.

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