Atmospheric
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Discussions

Interactive comment on "A Humidity-controlled Fast Integrated Mobility Spectrometer (HFIMS) for rapid measurements of particle hygroscopic growth" *by* Tamara Pinterich et al.

Anonymous Referee #2

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A new instrument for fast measurement of particle hygroscopicity, HFIMS, is reported in this paper. Different from the existing fast hygroscopicity measurement instruments, HFIMS measures the electrical mobility diameters of the grown particles so that particle density and refractive index are not needed anymore. Compared with the HTDMA, HFIMS avoids the diameter scan which is time consuming therefore has a much higher time resolution and may work on mobile platforms. The topic fits well in AMT and the manuscript is well written. I therefore recommend the final publication of this paper on AMT.

Specific comments:

C1

What is the maximum RH the system can reach? How about its stability at different RH levels? Since the RH is only measured before the flow entering WFIMS (not like HTDMA in which RH is also measured at the sheath exit), the real RH the particles undergo may be slightly different from the value given by RH sensors (e.g. in case of high particle concentration and very slow growth, or temperature difference between parts in the system). Does the author have any comment on this?

What is the time needed to washout all particles in the system at a typical setting of flow rates? The washout time may strongly influence the time resolution of the measurement.

The finite-width transfer function of WFIMS may cause a smooth effect in the measured distribution of GF. The discussion about it (P7L10) is a bit too brief. Can the author give a more detail discussion on the uncertain of GF distribution due to this effect? Is it possible and necessary to correct this smoothing effect?

Fig. 5: It seems that the blue dots are on the extension of the deliquescence part of the solid line (reported by Cruz and Pandis, 2000) but the red dots are a bit lower. Does the author have any explanation on this difference? Is it possible to add error bars as measurement uncertainty?

P5L6: It will be clearer if the definition of mobility resolution R is also given here.

Fig. 7: What is growth factor resolution, the ratio between growth factor and its uncertainty? It is better to give a clear definition in the text.

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