

Interactive comment on “Nano-hygrosopicity tandem differential mobility analyzer (nano-HTDMA) for investigating hygroscopic properties of sub-10 nm aerosol nanoparticles” by Ting Lei et al.

Anonymous Referee #1

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In the work submitted, Lei et al. presented the design, construction, calibration and validation of a nano-HTDMA apparatus, which can be used to measure hygroscopic growth of aerosol particles down to < 10 nm. The technique they developed is very important, and they also carried out calibration and validation experiments very comprehensively. The paper is also well-written, and I only have a few comments. General comments: Line 827: Compared to “sizing accuracy”, “sizing offset” may better describe the actual content of Section 3.1.1. Sections 2.2.1 and Section 3.1.1: I think both sizing accuracy (difference between actual size and the size measured using a

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DMA) and sizing offset (i.e. measured difference between the two DMAs) are important for H-TDMA. While sizing offset has been carefully characterized (Section 3.1.1) for particles down to a few nm, not much information has been provided for the sizing accuracy for <100 nm particles. Although experiments to determine size accuracy for <100 nm particles seem to be impossible, as discussed in Section 2.2.1, could the author estimate the sizing accuracy from a theoretical view? Line 300-305: It is interesting to find that sizing offset ($<0.9\%$) is smallest at 8 and 10 nm, smaller than that at smaller diameter (6 nm) and at larger diameter (20 nm or larger). Is there any explanation. Technical comments: Line 57: change "challenge" to "challenging". Line 349-353: I am not sure Wikipedia is a reliable source for physical/chemical constants. I would recommend textbooks/handbooks instead.

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