

Interactive comment on “A new electrodynamic balance design for low temperature studies” by H.-J. Tong et al.

Anonymous Referee #1

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The authors present a new electrodynamic balance setup intended for studying evaporation rates and nucleation studies at low temperatures. The new design is based on previous designs, but offers an interesting approach for cooling and temperature control of the particle by a gas flow system. The authors describe their setup; explain the analytical capabilities for sizing the particle and detecting phase change and show two types of experiments performed with the setup. The first is the evaporation of single water droplets at different temperatures; the second are experiments exploring the heterogeneous ice freezing properties of washing water from birch pollen.

While the experiments look interesting and the new setup well designed, I feel what is severely missing in the present paper is an experiment characterizing the new setup in a quantitative manner. The experiment of the evaporating water droplets could serve

C2358

as such, but the authors show only temperature dependent evaporation rates but point the reader to a forthcoming paper in which a quantitative comparison with theory is promised. In my opinion this is not acceptable. Without an experiment proving that the new setup is capable of reproducing either a previous experiment of another setup, or that the results obtained with the new one can be modeled using established theory, the performance of the new setup remain unclear. There could be for example issues with temperature gradients, with temperature stability, with calibration etc.. I am not all thinking that these problems do exist, but the paper in the present form does show only that the setup behaves as expected qualitatively.

The second experiment presented, namely the freezing probabilities of the washing water from birch pollen can also not serve as a reference since there is too little known about the exact properties of this nuclei.

I suggest that the authors either include the quantitative analysis of their evaporation data, or show another experiment to prove the capabilities of the new setup quantitatively.

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