Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2019-75-RC2, 2019

Atmospheric Measurement Techniques Discussions

Interactive comment on "Versatile Aerosol Concentration Enrichment System (VACES) operating as a Cloud Condensation Nuclei (CCN) concentrator. Development and laboratory characterization" *by* C. Dameto de España et al.

Anonymous Referee #2

Received and published: 21 May 2019

This is an experimental investigation manuscript that describes what the title offersâĂŤ "..Development and laboratory characterization." It is an extension of previously used VACES technology to test operation with somewhat smaller sized particles than tested in the past.

In general, this paper does demonstrate that CCN can be concentrated fairly well within the constraints of artificially generated NaCl. Inclusion of particles other than NaCl would have added strength to the paper. Further, the current paper employed PM over size range of 30 nm to 200 nm. It would be useful to provide discussions on the typical

profile of CCN characteristics and justify the choice of experimental conditions. The current manuscript needs minor revision before acceptance for publication.

Specific comments Section 4.1 NaCl is used for performance testing and the text indicates that there were no changes in chemistry or physical nature of collected in PM with VACES. There are very limited discussions to cover this point. How might other hygroscopic aerosols behave in terms of size/shape impacts of growth and drying process?

Section 4.2 "The order of the activation curves agrees with theory". This statement needs expansion. Further, figures seem to show quite a difference in efficiency of performance between small and larger test PM. Do the authors suggest that corrections can be made to adjust these values to account for observed differences? It also seems that at particles smaller than 30nm this could be an even larger issue. Further discussions on implications are suggested to be included.

Section 4.3 "Further results also demonstrate that the activation curves do not depend on the inlet concentration." The concentrations of NaCl had a maximal count of 6000 /cm3âĂŤ (monodisperse at 100nm). It would be useful to expand this statement to deal with what might be expected in terms of performance in real world.

Conclusions can be expanded to provide recommendations for future application in real world operations and extend beyond proofs by NaCl.

The closing sentences need a bit of cautionary text related to the real world applicationsâĂŤespecially with regards to temperature, size, chemistry issues. "Notwithstanding the strong temperature dependence, we found that the CCN VACES is a reliable instrument to activate CCN and enrich CCN concentrations at low supersaturations, provided that the temperature settings are carefully controlled."

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-75, 2019.