

Response Letter

Dear Editor

We hereby submit the latest revised version of the manuscript entitled:

“Stability and Composition of Large SA-MSA-Base Molecular Clusters”

for publication in *Aerosol Research*. We sincerely thank the editor and the reviewer for their careful evaluation of our revised manuscript and for the positive assessment. We have carefully considered the remaining minor comments and have made the corresponding corrections in the revised manuscript.

The reviewer’s comments are reproduced in [blue](#) below, followed by our point-by-point replies. Page and line numbers in our responses refer to the revised manuscript.

Sincerely,

Galib Hasan, on behalf of all authors

Response to Report #1

General assessment

The authors have carefully revised the manuscript and responded constructively to the comments raised during the discussion. The revised version explains the compositional scope and configurational-sampling procedures more clearly, provides additional validation information for the machine-learning model, and discusses the recent experimental and modelling studies relevant to MSA nucleation. The new title is also more consistent with the thermodynamic focus of the work. I consider the main concerns from the previous round to be adequately addressed, and the manuscript has reached an acceptable level for publication in *Aerosol Research*. I only have some minor comments that should be corrected before final publication.

Author reply:

We sincerely thank the reviewer for the positive assessment of our revised manuscript and for the careful evaluation of our responses to the previous comments. We appreciate the reviewer's constructive feedback. All of the remaining minor issues have been carefully addressed in the revised manuscript.

Minor Comments

Minor Comment 1. Page 2, line 36.

A question mark remains in the citation group after Sipilä et al. (2010). Please replace it with the intended reference or remove it.

Author reply:

Thank you for pointing this out. The unresolved citation following Sipilä et al. (2010) has now been corrected in the revised manuscript.

Minor Comment 2. Page 3, lines 78–80.

The sentence now states that MSA can enhance cluster formation potential by up to $n = 10$ acid–base pairs (20 molecules). This appears to be a revision error. The response letter indicates that the intended result is an enhancement of approximately 20-fold. Please restore the correct wording and citation context.

Author reply:

We thank the reviewer for identifying this revision error. The sentence has now been corrected to state that incorporating MSA into SA clusters can enhance cluster formation potential by up to approximately 20-fold. The corresponding citation to Elm (2022) has also been retained in the corrected context.

Minor Comment 3. Figure 7 caption.

The unit is still split as molecules, cm^{-3} , with an unnecessary comma and line break. It should appear as molecules cm^{-3} .

Author reply:

Corrected. The concentration unit in the Figure 7 caption is now written consistently as molecules cm^{-3} , without the unnecessary comma.

Minor Comment 4. References.

Several author names are not displayed correctly, including Kupiainen-Määttä, Vehkamäki, and Lönn. The Cooley et al. (2023) and Cromar and Lazrak (2023) entries also appear incomplete. Please check the full reference list against the source records.

Author reply:

Thank you for pointing this out. We have carefully checked the full reference list and corrected the formatting of author names containing special characters, including Kupiainen-Määttä, Vehkamäki, and Lönn. The bibliographic information for Cooley et al. (2023) and Cromar and Lazrak (2023) has also been completed and checked against the corresponding source records. In addition, the entire reference list was checked for similar formatting issues, including the proper presentation of subscripts in chemical formulas.

Minor Comment 5. Data availability, lines 363–365.

The data are currently available through the ACDB GitHub repository, but the link points to the mutable master branch. Aerosol Research asks authors who host data on GitHub to issue a DOI through Zenodo and cite the dataset in the reference list. Please archive the version used in this study, provide the corresponding DOI, and add a dataset citation to the reference list.

Author reply:

We thank the reviewer for this suggestion. The version of the data associated with this study has now been archived through our ACBD database and assigned a persistent DOI. The Data Availability section has been updated accordingly, and the archived dataset has also been added as a citation in the reference list.

The archived dataset is available at:

<https://doi.org/10.1021/acsomega.9b00860> (Elm, 2019)

We sincerely thank the editor and the reviewer again for their careful evaluation and constructive comments. We believe that these corrections have further improved the accuracy and presentation of the manuscript, and we hope that the revised version is now suitable for publication in *Aerosol Research*.