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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Experimental study of H_2SO_4 aerosol nucleation at high ionization levels" *by* Maja Tomicic et al.

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Referee comments on Tomicic et al. "Experimental study of H2SO4 aerosol nucleation at high ionization levels", acp-2017-902

General comments: Overall the paper is well written and clear. The experimental setup is described adequately and the results and analysis are clearly presented, along with uncertainties. The work is a useful addition to the field. However, I have a concern about some chosen experimental parameters.

Specific comments: I believe the authors need to include more explanation of some of their experimental parameters.

They say O3 was added to the experiment chamber. Why is that? I did not find an ex-

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Discussion paper

planation of why this was done, or the concentration added. It is important to consider what effect O3 may have on the processes involved.

Similarly, they say the pressure was held at 0.1 mbar. This is very low pressure compared to atmospheric pressure in the lower and even middle atmosphere. Likewise, they say the temperature was held at 295 K, which is relatively high compared to that in most of the atmosphere above ground level. These choices need to be explained. If the study was intended to apply to atmospheric conditions in the lower and middle atmosphere then these parameters are not appropriate. The results are still useful in a general sense, but may not give much insight into how SN ionization would affect nucleation in Earth's atmosphere, since the majority of ionization occurs under higher pressure and lower temperature. The authors could add some discussion about how different pressure and temperature would affect their results.

Technical corrections: I found one typo; on page 12, in the next-to-last paragraph of section 4, "where" should be "were" in the sentence "When the experiments where fitted. . ."

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