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Comment on Han et al.

Anonymous Referee #1

Referee comment on "Secondary organic aerosols from OH oxidation of cyclic volatile methyl siloxanes as an important Si source in the atmosphere" by Chong Han et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-965-RC1, 2021

This manuscript prepared by Han et al. describes an investigation of secondary organic aerosol (SOA) arising from cyclic volatile methyl siloxanes (cVMs). The SOA yield under a variety of atmospheric conditions was investigated using an oxidative flowtube reactor (OFR). The authors provided detailed discussions on the effect of NOx concentration, presence of seed, and oxidation lifetime. Chemical composition of the resulting SOA was monitored with an aerosol mass spectrometer (AMS). Further, the authors applied the obtained yield in a model to estimate the contribution of cVMS SOA on the global scale. The scope of the study matches that of ACP. The discussion and conclusions of the paper were fully justified, and the literary quality of the manuscript is outstanding. I highly recommend publication in ACP. My comments below can be considered only technical.

One thing that I feel is missing from the current manuscript is a brief discussion on the mechanism of OH reaction with cVMS. This shouldn't take more than a few sentences or a short paragraph. In addition to H-abstraction on the -CH3 groups, does OH undergo any reaction unique to e.g., O-Si bonds? Pieces of mechanistic information are provided in line 265 - 268, but it is hard for the readers to gauge whether that is generic OH chemistry or something unique to cVMS.

Figure S6b - It is a little counterintuitive that the Si/O ratio continued to rise during photooxidation. The number of Si in cVMS is fixed, while the molecule should be continuously oxidized. So Si/O should be decreasing as oxidation proceeds? The authors' discussion from line 259 to 270 did not really explain why Si/O was rising continuously.

Line 151 - the acronym, PTR-ToF-MS is already introduced previously.