RC2 comments:

I recommend publication of this work with minor revisions.

Q2-1: *It is suggested to provide the material of the tandem flow-tube (e.g., Pyrex,* stainless steel).

Reply2-1: The material information (quartz flowtube reactors) has been added at Line 90 and Line 107of the revised manuscript as follows.

"…the first quartz flowtube reactor …a secondary quartz flowtube reactor"

Q2-2: *The range of O_3 concentration is not mentioned in the paper. It is suggested that this parameter be clarified, as it is critical for the SOZ formation.*

Reply2-2: The range of O_3 concentration has been added at Line 95 on Page 4 of the revised manuscript as follows.

"The O_3 concentration in the first flowtube reactor was varied from 0 to 0.678 ppm."

Q2-3: *A supplementary table, listing values of $\gamma_{eff,2FT}$ and $\gamma_{eff,1FT}$ for representative SOZs, carboxylic acids, and aldehydes, can be useful to add.*

Reply2-3: A new supplementary Table S2, listing values of $\gamma_{eff,2FT}$, $\gamma_{eff,1FT}$ and $\Delta\gamma_{eff}$ for representative SOZs, carboxylic acids, and aldehydes has been added to the *Supplementary Information*. Meanwhile, an introduction for this Table S2 has been added at Line 158 on Page 6 of the revised manuscript as follows.

"…calculated using Equations E2 and E3 (Fig. 2c and Table S2)."

Q2-4: *The curves for different intermediates (e.g., dihydroxylamine vs. hydroxylamine) in Figure 6 are distinguished only by color. Adding distinct symbol types would improve the clarity of the figure.*

Reply2-4: In the revised manuscript, Figure 6d has been updated by using different symbol types for dihydroxylamine and hydroxylamine, as follows.

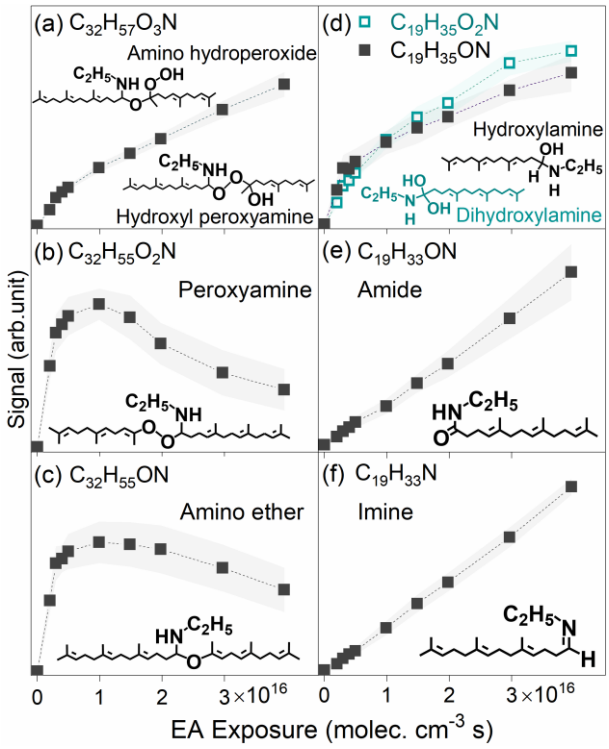

Figure 6: Experimental signal as a function of ethylamine (EA) exposure for: (a) hydroxyl peroxyamine (or amino hydroperoxide), (b) peroxyamine, (c) amino ether, (d) dihydroxylamine and hydroxylamine, (e) amide, and (f) imine.

Q2-5: *It seems that the caption for Figure 6 mentions "Relative abundance", which does not align with the y-axis label "Signal (arb. unit)". Please update the caption to ensure the consistency between the figure and its description.*

Reply2-5: The phrase "Relative abundance" in the caption of Fig. 6 has been revised to "Experimental signal" on Page 15 of the revised manuscript.

Q2-6: Line 30, the phrase "initiates through the nucleophilic attack" should be grammatically expressed as "is initiated by a nucleophilic attack".

Reply2-6: The phrase "initiates through the nucleophilic attack" has been revised to "is initiated by a nucleophilic attack" in Line 32 of the revised manuscript.

Q2-7: Line 38, "ethylamine and on a C_{15} SOZ" contains a superfluous conjunction. For clarity, this should be corrected to "ethylamine on a C_{15} SOZ".

Reply2-7: The phrase "ethylamine and on a C_{15} SOZ" has been revised to "ethylamine on a C_{15} SOZ" in Line 40 of the revised manuscript.

Q2-8: Line 116-117, the sentence "the net contribution of heterogeneous reactions… were quantitatively determined" has a subject-verb agreement error. Please correct it to "the net contribution... was quantitatively determined."

Reply2-8: The verb "were" has been corrected to "was" in Line 122 of the revised

manuscript.

Q2-9: Check the capitalization style of the article titles in the references. It seems that there is an inconsistency in the use of capitalization, specifically regarding sentence case *vs.* title case. It is recommended to standardize the format according to the journal's guidelines.

Reply2-9: The capitalization of references titles in the revised manuscript and *Supplementary Information* has been standardized according to the *Atmospheric Chemistry and Physics* style.

Q2-10: Both relative humidity and pH are critical factors influencing the heterogeneous reactions involving amines. Thus, if the reaction system has recorded humidity and pH data, it is advisable to explicitly state them in the manuscript.

Reply2-10: The experiments were conducted under dry conditions. According to Heine et al. (Environ. Sci. Technol. 2017, 51, 13740), the relative humidity (RH) under similar dry conditions correspond to approximately 3%. As for pH value, it was not recorded. This RH information has been added at Line 113 on Page 5 of the revised manuscript as follows.

"The experiments have been conducted under dry condition, corresponding to a relative humidity of approximately 3% (Heine et al., 2017)."