The authors thank you for dedicating your time to reviewing our work, and we greatly value to reviewing our work, and we consider it very valuable to have the opportunity to discuss the results. Below, we present our point-by-point response to your comments.

Referee #3

General Comments:

The manuscript investigates the oxidation processes of two VOCs, specifically 3,3-dimethylbutanal and 3,3-dimethylbutanone, by Cl (with and without NO), NO3, and OH radicals. The authors provide extensive and detailed information on the chemical kinetics, reaction pathways, and resulting products. This study makes a significant contribution to our understanding of the oxidation mechanisms of 3,3-dimethylbutanal and 3,3-dimethylbutanone, particularly those involving Clorine atoms. However, I have some concerns regarding the treatment of wall loss. Once this issue is addressed and improve the quality of certain figures, the manuscript will be ready for publication in ACP.

Regarding the wall loss description (Line 149), while the results indicate minimal losses for 3,3-dimethylbutanal (3%) and 3,3-dimethylbutanone (0%), it is essential to account for potential wall loss impacts for oxidants like chlorine, N2O5, and NO3 on the rate constant results. Heterogeneous reactions, such as wall loss, may introduce uncertainties in chamber studies. Previous chamber studies have reported wall loss rates for these Cl, N2O5 , and NO3 (e.g., https://doi.org/10.5194/acp-2020-360 and https://doi.org/10.1016/j.cplett.2009.03.047). The authors should provide more detailed data on wall loss rates to reinforce the reliability of their findings.

Response of authors.

In our case, a relative method is used, unlike the study described in https://doi.org/10.1016/j.cplett.2009.03.047, which employs an absolute method.

We conducted experiments to determine the wall losses of CH_3ONO and N_2O_5 in the reactor (heterogeneous process), finding that this loss is significant for N_2O_5. In the case of Cl_2 and atomic Cl, we did not measure their losses because we lack a detection system for Cl_2 or atomic Cl. However, in the relative methodology, if the loss of the oxidant or precursors is significant, it would result in a reduced concentration of the oxidant available to react with the reactants (reference compound and carbonyl). This affects the reaction rates of both equally but not the rate constant itself. The loss constant due to heterogeneous reactions of the oxidants is not included in the kinetic equation derived from the relative method.

On the other hand, for the kinetic study of 3,3-dimethylbutanone with OH and Cl, as well as 3,3-dimethylbutanal with Cl, the prior studies demonstrated that over 45 minutes the loss of 33DMbutanal is less than 3% and 0% 33DMbutanone. Therefore, the losses of 33DMbutanone and 33DMbutanal are considered negligible. This is extensively explained in the responses to referees #1 and #2.

Some figures need quality improvement. For instance, Figure 2 requires a legend, and Figure 6 shows low resolution with small, hard-to-read text; it may be better suited for the

supplementary document. Additionally, Figure 8 is difficult to read and should be rearranged to enhance readability.

Response of authors.

In Figure 2, there is indeed a legend, although it is so small that it is difficult to see clearly. Due to the large number of spectra in this figure, it has been difficult to improve the quality while maintaining the full spectrum (from 800 cm^{-1} to 3000 cm^{-1}).

For Figure 6, it is also difficult to obtain a higher-resolution image as these are directly obtained from the GCMS software. The authors deemed it appropriate to include some of the chromatograms in the manuscript so that readers can verify the formation of the reaction products. We will attempt to improve the resolution; however, as the referee suggests, this figure could be moved to the supplementary information, where the spectra can be enlarged and visualized more clearly.

The Figure 8, will be rearranged to enhance readability in a revised manuscript

Specific Comments:

Line 259: Does "x3" in Channel II refer to three attack sites?

There is no clear explanation of what "x3" means in this context. The same issue arises in Line 264 for Channel III.

It refers to the fact that the radical attack on the -CH_3 group of the tert-butyl group should be multiplied by 3. Since all three positions are equivalent, only one instance is included, and therefore, the products formed through this pathway are the same. A sentence will be added to the manuscript to clarify what "x3" indicates: `x3' indicates that there are 3 equivalent attack positions.`

Footnote Description table1: The footnote description is unclear. It is not specified whether "a" uses 10^-10, "b" uses 10^-11, and "c" uses 10^-12, or what KR represents. Please revise this for clarity.

Ok, the suggested changes will be taken into account in a revised manuscript

Figure 8: In Channel III, (49% X=Cl); 2% X= OH….NO3), there should be no ")" inside

Ok, the suggested changes will be taken into account in a revised manuscript