Response to the reviewer's comments for manuscript acp-2021-962

Title: "Kinetic Study of the Atmospheric Oxidation of a Series of Epoxy Compounds by OH Radicals"
by Carmen Maria Tovar et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-962-RC1, 2022
Special Issue: Simulation chambers as tools in atmospheric research (AMT/ACP/GMD inter-journal SI)

The reviewers' valuable suggestions and comments aided us in improving the quality of the manuscript. We are very grateful.

B. Comments by Referee #1

R1: The authors have addressed all my comments. I recommend this article for publication after minor punctuation/grammar edits (lines 39, 69, 151, 184/185, 256, and370).

Reply from the authors:

We appreciate the suggestions. The manuscript has been modified accordingly.

B. Comments by Referee #2

R2: This paper summarizes several experiments in a pair of relative rate reactors to determine the rate constants of the OH reactions with a series of epoxides. The kinetics of epoxide reactions with OH have only been studied with a limited number of epoxides to this point. The literature values of those rate constants are compared and are in good agreement with the values obtained in this study. Having reviewed the previous version of this paper, I commend the authors for the changes they have made as it has greatly strengthened the paper. The revised tables and figures are a big improvement. The paper could stand to have a thorough read through for grammatical errors, particular those with regard to tense. I have highlighted a few below, but there are likely some I have missed. Pending those corrections, I recommend publication of the paper.

Reply from the authors:

We appreciate the suggestions. The manuscript has been thoroughly checked for grammar and English errors as well as for technical errors.

P4 L121: Gases were injected

Reply from the authors: The manuscript has been modified accordingly.

P4 L122: ….was heated up to…..

Reply from the authors: The manuscript has been modified accordingly.

P4 L124: …..spectra were recorded…..

Reply from the authors: The manuscript has been modified accordingly.

P4 L125: These tests were performed…..

Reply from the authors: The manuscript has been modified accordingly.

P6 L171: ….kinetic study was constrained……

Reply from the authors: The manuscript has been modified accordingly.

P8 L205 The error of the slope…… This sentence is a little awkward and could be rephrased.
Reply from the authors: The manuscript has been modified accordingly.

P8 L207: Why was 10% chosen?
Reply from the authors:

The overall error quoted in Table 2 comprises the 2σ statistical error resulted from the regression of the linear plots and an attributed 10% uncertainty for the reference compounds rate constants. Atkinson et al., (1986) in the "Kinetics and Mechanisms of the Gas-Phase Reactions of the Hydroxyl Radical with Organic Compounds under Atmospheric Conditions" Chemical Review, 86, 69-201, suggests using an error of 15-30% associated uncertainties for the rate constants used in relative rate method to count for possible errors due to wall deposition, dilutions, etc. Since in our system there are no wall losses, and no additional corrections were necessary, a reasonable 10% uncertainty has been counted.
The uncertainties of the reference compound's rate constants are presented in the text of the article (lines 177-182) and together with the associated 2σ uncertainty of the ratio of k(epoxides)/k(reference), the associated errors of epoxides rate constant values could be easily calculated. However, according to the reference literature data, there are different approaches used to evaluate such associated uncertainties for the kinetic rate constants of the reference compounds. Table 2 in the manuscript provides information on the ratio of k(epoxides)/k(reference) and associated 2σ uncertainty for recalculating the k(epoxides) values and re-evaluating the uncertainties according to possible future values of the reference compound rate constants.

P9 L232: The ethylene oxide…. Again this is a bit of awkward sentence
Reply from the authors: The manuscript has been modified accordingly.

P15 L392: These kind of calculations….
Reply from the authors: The manuscript has been modified accordingly.

P18 L444: Should be written 1.13 x 10^6
Reply from the authors: The manuscript has been modified accordingly.

P19 L482: rate coefficients…
Reply from the authors: The manuscript has been modified accordingly.