

Interactive comment on “Atmospheric chemistry of trans-CF₃CH=CHF: products and mechanisms of hydroxyl radical and chlorine atom initiated oxidation” by M. S. Javadi et al.

Anonymous Referee #2

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This manuscript reports on a kinetic and product study of the reactions of OH radicals and Cl atoms with trans- CF₃CH=CHF, a potential replacement compounds for hydrofluorocarbons such as HFC-134a. This experimental study is thorough and the conclusions well supported by the data. Comments which would, in my view, improve the presentation are as follows:

Page 1072, line 12. A comma after CF₃CH=CHF seems appropriate.

Page 1072, line 26. The authors could note the % conversions that a CF₃CH=CHF consumption of <1 mTorr corresponded to.

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Page 1073, lines 11-13. The authors should state the maximum fraction of CF₃CHO removed by secondary reactions with OH radicals.

Page 1073, lines 15-19. Do the authors mean the formation of CF₃CH(ONO₂)CHFOH and CF₃CH(OH)CHFONO₂ formed from the reactions of the corresponding alkoxy radicals with NO₂? Some additional discussion and specificity is needed here. Clearly, the same effect is not observed in the Cl atom reaction system, suggesting that the decrease in CF₃CHO and HC(O)F yields at larger extents of reaction does involve NO₂ (and not NO).

Page 1074, line 12. Maybe add "(see below)" after "we attribute to the ketone CF₃C(O)CHFCl."

Page 1075, line 2. I assume that the lack of loss of CF₃C(O)Cl was in the same chamber as used here. If so, say so.

Page 1075, line 17, Maybe replace "the alkoxy" by "these alkoxy", since this statement is specific to the alkoxy radicals formed in reactions (7a) and (7b).

Page 1076, line 23. The CF₃CH(O)CH₂Cl radical should be CF₃CH(O)CHFCl.

Page 1076, lines 28-29. I suggest adding "therefore" after "bond scission is". The present product data presumably suggest that approximately 70% of the CF₃CHClCHFO radicals undergo decomposition in 700 Torr of air?

Page 1077, lines 9-21. I would have thought it possible to include formation of the not observed product CF₃C(O)CHFCl and use the previously measured rate constant ratio k₁₀/k₁₁ in a more comprehensive modeling of the data.

Figure 1. I assume that the banded structure in traces (a) and (b) is due to NO? This could be noted in the figure caption or labeled on the trace,

Figure 8. The inclusion of reactions involving NO in Figure 8 (converting RO₂ to RO) means that Figure 8 is more applicable to the atmosphere than the chamber experi-

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ments discussion in this article. This should be noted. Furthermore, it would be useful for the reader to indicate the percentages associated with the various reaction steps for 700 Torr of air conditions. Alternatively, the reaction numbers cited in the text could be added to aid the reader. What is the measured carbon balance at 700 Torr of air?

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 1069, 2008.

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