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Atmospheric chemistry of trans-$CF_3CH=CHF$: products and mechanisms of hydroxyl radical and chlorine atom initiated oxidation

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Abstract. Smog chamber/FTIR techniques were used to study the products and mechanisms of OH radical and Cl atom initiated oxidation of trans-$CF_3CH=CHF$ in 700 Torr of N_2/O_2 diluent at 295±1 K. Hydroxyl radical initiated oxidation leads to the formation of CF_3CHO and HC(O)F in yields which were indistinguishable from 100% and were not dependent on the O_2 partial pressure. Chlorine atom initiated oxidation gives HC(O)F, CF_3CHO, $CF_3C(O)Cl$, and $CF_3C(O)CHFCl$. The yields of $CF_3C(O)Cl$ and $CF_3C(O)CHFCl$ increased at the expense of HC(O)F and CF_3CHO as the O_2 partial pressure was increased over the range 5–700 Torr. The results are discussed with respect to the atmospheric chemistry and environmental impact of trans-$CF_3CH=CHF$.

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