Supplementary information

Kinetics of $CF_3CH_2OCH_3$ (HFE-263fb2), $CHF_2CF_2CH_2OCH_3$ (HFE-374pcf), and $CF_3CF_2CH_2OCH_3$ (HFE-365mcf3) with OH radicals, IR absorption cross sections, and global warming potentials

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IR absorption cross sections of HFEs

As Figure S3 shows, even though the differences in the literature peak IR absorption cross sections $\sigma_{\tilde{\upsilon},max}$ presented in Table S6, are not huge, a noticeable difference for HFE-263fb2 ($CF_3CH_2OCH_3$) and for HFE-365mcf3 ($CF_3CF_2CH_2OCH_3$) is observed. The IR spectra from Oyaro et al. (2004, 2005) are systematically lower than those from Østerstrøm et al. (2012) and Thomsen et al. (2011). Moreover, note that the IR spectrum reported by Thomsen et al. (2011) presents a zig-zag noise in the whole spectrum. For HFE-374pcf ($CHF_2CF_2CH_2OCH_3$), the only IR spectrum available in the literature is that from Oyaro et al. (2004). As these authors systematically report lower IR absorption cross sections, a further study is worth it.

Radiative efficiencies and global warming potentials

The f_τ factor is defined as:

$$f_\tau = \frac{a\tau^b}{1+c\tau^d} \quad \text{(ES1)}$$

where *a*, *b*, *c*, and *d* are constants with values of 2.962, 0.9312, 2.994, and 0.9302, respectively (Hodnebrog et al. (2013; 2020)). As the OH-reaction is usually the most important degradation route for atmospheric pollutants, τ is commonly expressed as τ_{OH}.

REs of $CF_3CH_2OCH_3$, $CHF_2CF_2CH_2OCH_3$, and $CF_3CF_2CH_2OCH_3$ were calculated from equation ES2 using the radiative efficiency (for a 0–1 ppb increase in mixing ratio) per unit cross section (F^σ in W m^{-2} cm molecule cm^{-2}) at a 1 cm^{-1} resolution reported in the updated Oslo line-by-line radiative transfer model that now accounts for stratospheric temperature adjustment (Shine and Myhre, 2020).

$$RE_i = f_\tau \times \sum_{500cm^{-1}}^{3000cm^{-1}} \sigma_{\tilde{\upsilon},i}\ F^\sigma \quad \text{(ES2)}$$

As in our previous works (Blázquez et al., 2017; Antiñolo et al., 2017; González et al., 2016; Jiménez et al., 2016; González et al., 2015), GWPs of HFEs for a time horizon of 100 years ($GWP_i(100\ yrs)$) were calculated by the following expression, according to Hodnebrog et al. (2013; 2020):

$$GWP_i(100\ yrs) = \frac{AGWP_i(100\ yrs)}{AGWP_{CO_2}(100\ yrs)} \quad \text{(ES3)}$$

where $AGWP_{CO_2}(100\ yrs)$ is the absolute GWP of CO_2 with value of 8.064×10^{-14} (in Wm^{-2} yr $(kg\ CO_2)^{-1}$) and $AGWP_i(100\ yrs)$ is the absolute GWP for the HFE at the same time horizon, which is defined as:

$$AGWP_i(100\ yrs) = RE_i \times \tau_{OH} \times \left[1 - \exp\left(-\frac{100\ yrs}{\tau_{OH}}\right)\right] \quad \text{(ES4)}$$

where τ_{OH} and RE_i are expressed in years and W m^{-2} $(kg\ HFE)^{-1}$, respectively.

In Table S7, τ_{OH}, REs, and *GWP(100 yrs)* for some HFCs with the same number of C-F bonds of the investigated HFEs are also presented. It is clear that the presence of the ether group decreases τ_{OH} from several years for HFCs to 2-3 weeks for HFEs (Hodnebrog et al., 2020). If we compare the RE of HFE-263fb2 with that of the corresponding HFC, $CF_3CH_2CH_3$ (HFC-263fb), a noticeable decrease is observed (Hodnebrog et al., 2020). This, together with a lifetime of 1.2 years, makes the *GWP(100 yrs)* be two orders of magnitude higher than that for HFE-263fb2. The analogous HFC of $CHF_2CF_2CH_2OCH_3$ and $CF_3CF_2CH_2OCH_3$ are $CHF_2CF_2CH_2CH_3$ and $CF_3CF_2CH_2CH_3$, respectively. To our knowledge, their OH-kinetics and IR absorption cross sections have not been reported to date. For that reason, the RE and *GWP(100 yrs)* of $CHF_2CF_2CH_2OCH_3$ and $CF_3CF_2CH_2OCH_3$ are compared with those of CHF_2CHF_2 (HFC-134), and CHF_2CF_3 (HFC-125), and $CF_3CF_2CH_3$ (HFC-245cb), which have 4 and 5 C-F bonds (Hodnebrog et al., 2020). The RE of HFC-134 is more than 6 times higher than that for HFE-374pcf, while the decrease in *GWP(100 yrs)* is huge, from 1330 to 0.46. Similarly, the RE for HCF-125 and HFC-245cb are more than 6 times higher than that for HFE-365mcf3. In combination with the large atmospheric lifetime (30 and 39.9 years), their *GWP(100 yrs)* are more than three orders of magnitude higher (6793 and 8259) (Hodnebrog et al., 2020) than that of HFE-365mcf3.

SUPPLEMENTARY TABLES

Table S1. Experimental conditions and individual rate coefficients (±2σ) for the OH + $CF_3CH_2OCH_3$ reaction.

T / K	p_T / Torr	f / 10^{-2}	F_R / sccm	$F_{H_2O_2/He}$ / sccm	F_{He} / sccm	[$CF_3CH_2OCH_3$] / 10^{15} molecules cm^{-3}	k'-k'_0 / s^{-1}	$k_{OH}(T)$ / 10^{-13} cm^3 molecule^{-1} s^{-1}
263	50	3.65	9.4 – 85.1	12.3	366.6 – 458.9	1.33 – 12.3	760 – 7040	5.87 ± 0.32
	50	1.49	10.3 – 94.0	12.3	366.6 – 458.9	0.60 – 5.41	311 – 3391	6.38 ± 0.27
	250	1.59	1.5 – 12.3	11.3	448.3 – 460.7	0.46 – 3.81	383 – 2494	6.53 ± 0.38
	250	1.59	1.5 – 13.7	11.3	446.9 – 460.7	0.46 – 4.23	343 – 2745	6.42 ± 0.30
	500	1.59	1.5 – 13.7	12.3	445.0 – 458.9	0.93 – 8.48	584 – 4970	6.14 ± 0.41
	500	3.65	1.4 – 12.4	12.3	457.5 – 458.9	1.93 – 17.6	1394 – 10220	5.58 ± 0.21
268	50	1.49	10.3 – 47.5	12.3	412.8 – 458.9	0.32 – 2.69	206 – 1700	6.18 ± 0.51
	50	3.97	9.2 – 83.3	12.3	366.6 – 458.9	1.40 – 12.9	873 – 7170	5.62 ± 0.35
	50	3.97	9.2 – 75.1	12.3	375.9 – 458.9	1.40 –11.6	1011 – 7502	6.49 ± 0.40
278	50	1.50	10.3 – 84.7	4.0	385.1 – 468.1	0.57 – 4.65	375 – 3374	6.95 ± 0.44
	50	3.99	9.2 – 83.2	4.0	375.9 – 468.1	1.35 –12.5	1021 –7707	6.32 ± 0.32
288	50	1.50	10.3 – 93.9	8.6	371.2 – 463.5	0.55 – 4.99	573 – 3593	6.86 ± 0.37
	50	3.99	9.2 – 83.2	8.6	371.2 – 463.5	1.30 – 12.0	1027 –7911	6.53 ± 0.18
298	50	3.98	9.2 – 83.2	7.6	371.2 – 463.5	1.26 – 11.6	996 – 7737	6.46 ± 0.24
	50	3.32	9.6 – 86.9	4.0	375.9 – 468.1	1.09 – 10.0	748 – 6949	7.11 ± 0.20
	250	3.98	0.9 – 8.2	15.8	449.7 – 458.9	0.63 – 5.55	452 – 4112	7.46 ± 0.40
	250	3.90	1.3 – 12.2	11.3	446.9 – 460.7	0.90 – 8.20	621 – 6400	7.38 ± 0.57
	500	3.98	0.9 – 8.2	29.2	435.8 – 445.0	1.27 – 11.1	949 – 8091	7.08 ± 0.46
	500	3.90	0.9 – 8.2	26.5	435.8 – 445.0	1.25 – 11.0	952 – 7832	7.09 ± 0.34
309	50	2.29	10.1 – 91.4	4.0	375.9 – 468.1	0.76 – 6.92	666 – 4983	7.17 ± 0.32
	50	2.06	9.6 – 86.9	4.0	375.9 – 468.1	0.65 –6.00	579 – 4920	8.02 ± 0.28
323	50	2.29	10.3 – 93.5	4.0	375.9 – 468.1	0.40 – 3.68	446 – 3179	8.37 ± 0.35
	50	2.29	10.1 – 91.4	4.0	375.9 – 468.1	0.73 – 6.62	701 –5876	8.89 ± 0.33
	50	2.06	9.6 – 86.9	4.0	375.9 – 468.1	0.63 – 5.74	613 –4683	8.13 ± 0.27
338	50	2.12	10.1 – 92.0	4.0	375.9 – 468.1	0.49 – 4.43	507 – 3845	8.56 ± 0.28
	50	2.92	9.8 – 88.8	4.0	375.9 – 468.1	0.86 –7.89	771 – 6734	8.40 ± 0.21
353	50	3.47	9.5 – 86.1	4.0	375.9 – 468.1	0.71 – 6.57	788 – 6225	9.57 ± 0.56
	50	3.90	5.1 – 42.4	4.0	237.5 – 283.6	0.95 – 7.95	672 – 8024	9.73 ± 0.46
	250	0.54	10.5 – 96.0	35.9	343.6 – 435.8	0.83 – 7.52	1015 – 6828	9.02 ± 0.32
	250	1.66	5.6 – 47.3	26.5	398.9 – 445.0	1.02 – 8.52	1088 – 7880	8.96 ± 0.38
	250	3.90	1.3 – 12.2	11.3	459.3 – 460.7	0.76 – 6.92	629 – 6983	9.70 ± 0.57
	500	2.99	1.3 – 12.2	35.9	422.0 – 435.8	1.16 – 10.6	1148 – 10315	9.57 ± 0.62
	500	2.92	1.4 – 12.8	35.9	422.0 – 435.8	1.19 – 10.9	1277 – 9510	9.11 ± 0.51

Table S2. Experimental conditions and individual rate coefficients (±2σ) for the OH + $CHF_2CF_2CH_2OCH_3$ reaction.

T / K	p_T / Torr	f / 10^{-2}	F_R / sccm	$F_{H_2O_2/He}$ / sccm	F_{He} / sccm	[$CHF_2CF_2CH_2OCH_3$] / 10^{15} molecules cm^{-3}	k'-k'_0 / s^{-1}	$k_{OH}(T)$ / 10^{-13} cm^3 $molecule^{-1}$ s^{-1}
263	50	1.86	6.1 – 51.0	24.4	219.0 – 265.1	0.71 – 5.90	561 – 4888	8.60 ± 0.48
	50	2.49	7.9 – 88.5	9.6	371.2 – 463.5	0.77 – 8.61	636 – 7382	8.79 ± 0.63
	250	0.74	6.6 – 55.2	27.8	214.4 – 260.5	1.54 – 12.6	1253 – 10759	8.43 ± 0.29
	250	1.86	0.8 – 9.0	46.8	232.9 – 242.1	0.48 – 5.33	247 – 4323	8.34 ± 0.52
	500	0.74	0.9 – 12.5	46.8	231.0 – 242.1	0.43 – 5.81	259 – 4897	8.23 ± 0.49
	500	3.05	0.8 – 8.4	17.0	445.0 – 454.3	0.93 – 10.0	644 – 8026	8.10 ± 0.40
268	50	3.73	6.5 – 73.9	4.0	375.9 – 468.1	0.93 – 10.9	915 – 9931	8.85 ± 0.49
	50	2.72	5.6 – 46.3	11.3	228.2 – 274.4	0.95 – 7.94	796 – 6767	8.59 ± 0.33
278	50	3.28	6.4 – 66.1	4.0	385.1 – 468.1	0.78 – 8.28	1045 – 7575	9.26 ± 0.67
	50	2.72	5.6 – 46.3	8.6	232.9 – 279.0	0.91 – 7.61	873 – 6940	9.30 ± 0.40
288	50	3.21	5.2 – 43.2	4.0	237.5 – 283.6	0.97 – 8.16	799 – 7599	9.44 ± 0.54
	50	2.72	5.6 – 46.3	4.0	237.5 – 283.6	0.88 – 7.34	747 – 6682	9.36 ± 0.31
298	50	2.66	5.6 – 46.7	4.0	237.5 – 283.6	0.83 – 6.97	783 – 6605	9.43 ± 0.20
	50	3.21	5.2 – 43.2	4.0	237.5 – 283.6	0.94 – 7.88	902 – 8029	10.2 ± 0.3
	50	3.21	5.2 – 43.2	4.0	237.5 – 283.6	0.94 – 7.88	947 – 7947	10.1 ± 0.4
	250	0.37	6.7 – 56.2	19.5	219.0 – 265.1	0.70 – 5.65	682 – 5329	9.23 ± 0.27
	250	0.37	6.7 – 56.2	18.4	223.6 – 269.8	0.69 – 5.58	614 – 5402	9.67 ± 0.33
	500	0.19	6.8 – 56.6	27.8	214.4 – 260.5	0.72 – 5.82	822 – 5752	9.80 ± 0.57
	500	0.14	6.8 – 56.7	27.8	214.4 – 260.5	0.53 – 4.27	532 – 4272	9.86 ± 0.33
309	50	2.66	5.6 – 46.7	4.0	237.5 – 283.6	0.80 – 6.72	826 – 6995	10.0 ± 0.5
	50	2.75	5.5 – 46.2	4.0	237.5 – 283.6	0.82 – 6.89	953 – 7650	10.7 ± 0.6
323	50	2.66	5.6 – 46.7	4.0	237.5 – 283.6	0.77 – 6.43	802 – 6782	10.6 ± 0.3
	50	2.75	5.5 – 46.2	4.0	237.5 – 283.6	0.79 – 6.59	884 – 7103	11.1 ± 0.4
338	50	2.66	5.6 – 46.7	4.0	237.5 – 283.6	0.73 – 6.15	832 – 7028	11.5 ± 0.3
	50	2.75	5.5 – 46.2	4.0	237.5 – 283.6	0.75 – 6.30	851 – 6915	10.9 ± 0.3
353	50	2.75	5.5 – 46.2	4.0	237.5 – 283.6	0.72 – 6.03	891 – 7182	11.4 ± 0.5
	50	2.75	5.5 – 46.2	4.0	237.5 – 283.6	0.72 – 6.03	1005 – 7097	11.6 ± 0.5
	250	0.42	6.7 – 56.1	19.5	219.0 – 265.1	0.68 – 5.50	706 – 6205	11.2 ± 0.3
	250	0.42	6.7 – 56.1	19.5	219.0 – 265.1	0.68 – 5.50	740 – 6371	11.6 ± 0.2
	500	0.42	6.7 – 45.1	42.4	205.2 – 242.1	1.36 – 8.91	1543 – 9965	11.1 ± 0.2
	500	0.18	12.3 – 112.0	42.4	149.8 – 242.1	1.04 – 8.95	1149 – 10007	11.4 ± 0.5

Table S3. Experimental conditions and individual rate coefficients (±2σ) for the OH + $CF_3CF_2CH_2OCH_3$ reaction.

T / K	p_T / Torr	f / 10^{-2}	F_R / sccm	$F_{H_2O_2/He}$ / sccm	F_{He} / sccm	[$CF_3CF_2CH_2OCH_3$] / 10^{15} molecules cm^{-3}	k'-k'_0 / s^{-1}	$k_{OH}(T)$ / 10^{-13} cm^3 $molecule^{-1}$ s^{-1}
263	50	5.53	2.1 – 32.4	27.7	403.8 – 451.0	0.46 – 7.10	539 – 5478	7.67 ± 0.36
	50	1.87	8.3 – 83.5	14.4	182.1 – 274.4	0.99 – 10.2	1023 – 8172	7.79 ± 0.25
	250	2.00	0.6 – 8.1	98.6	186.7 – 195.9	0.36 – 5.06	588 – 4294	7.89 ± 0.60
	250	2.00	0.6 – 8.1	14.7	265.1 – 274.4	0.36 – 5.15	532 – 4211	8.08 ± 0.34
	500	1.56	0.6 – 8.3	9.8	269.8 – 279.0	0.60 – 8.30	809 – 6681	7.85 ± 0.36
	500	1.87	0.6 – 8.2	19.6	260.5 – 269.8	0.69 – 9.74	977 – 8394	8.09 ± 0.46
268	50	1.87	8.3 – 83.5	14.4	182.1 – 274.4	0.97 – 10.1	930 – 7997	7.98 ± 0.32
	50	1.97	8.3 – 74.7	14.4	191.3 – 274.4	1.02 – 9.43	902 – 7908	8.14 ± 0.30
278	50	1.97	8.3 – 66.4	4.8	209.8 – 283.6	0.99 – 8.07	935 – 6885	8.26 ± 0.31
	50	2.62	4.2 – 35.8	4.8	242.1 – 283.6	0.66 – 5.77	478 – 4746	8.32 ± 0.49
288	50	2.62	4.2 – 39.8	4.8	237.5 – 283.6	0.64 – 6.20	637 – 5394	8.52 ± 0.27
	50	2.62	4.2 – 39.8	4.8	237.5 – 283.6	0.64 – 6.20	682 – 5296	8.58 ± 0.42
298	50	2.62	4.2 – 35.8	3.8	243.0 – 284.5	0.62 – 5.38	662 – 5039	9.14 ± 0.68
	50	3.07	4.2 – 38.9	3.8	238.4 – 284.5	0.73 – 6.87	736 – 6261	8.88 ± 0.30
	250	0.50	3.5 – 46.0	14.4	228.2 – 274.4	0.49 – 6.45	670 – 6187	9.45 ± 0.33
	250	0.50	3.5 – 14.4	14.4	228.2 – 274.4	0.49 – 6.45	777 – 6331	9.45 ± 0.34
	500	2.53	0.5 – 7.8	24.6	255.9 – 265.1	0.77 – 11.1	1179 – 10045	8.82 ± 0.45
	500	2.53	0.5 – 7.8	24.6	255.9 – 265.1	0.77 – 11.1	1194 – 9781	8.74 ± 0.49
309	50	3.07	4.2 – 38.9	3.8	238.4 – 284.5	0.70 – 6.62	807 – 6111	9.05 ± 0.23
	50	3.07	4.2 – 38.9	3.8	238.4 – 284.5	0.70 – 6.62	808 – 6159	8.99 ± 0.33
323	50	3.07	4.2 – 38.9	3.8	238.4 – 284.5	0.67 – 6.34	756 – 6175	9.66 ± 0.26
	50	3.07	4.2 – 38.9	3.8	238.4 – 284.5	0.67 – 6.34	843 – 6573	10.1 ± 0.4
338	50	3.11	4.2 – 38.8	3.8	238.4 – 284.5	0.65 – 6.13	747 – 6436	10.2 ± 0.3
	50	3.11	4.2 – 38.8	3.8	238.4 – 284.5	0.65 – 6.13	767 – 6362	10.2 ± 0.3
353	50	3.11	4.2 – 35.0	4.8	242.1 – 283.6	0.62 – 5.28	890 – 6059	11.0 ± 0.5
	50	3.11	4.2 – 38.8	4.8	237.5 – 283.6	0.62 – 5.87	871 – 6491	10.7 ± 0.4
	250	2.53	0.5 – 7.8	14.7	265.1 – 274.4	0.33 – 4.71	683 – 5352	10.8 ± 0.5
	250	2.53	0.5 – 7.8	14.7	265.1 – 274.4	0.33 – 4.71	646 – 5477	11.0 ± 0.5
	500	5.38	7.8 – 81.1	105.0	299.9 – 384.9	1.17 – 12.3	1372 – 13856	10.8 ± 0.7
	500	2.00	0.6 – 8.1	24.6	255.9 – 265.1	0.54 – 7.66	1050 – 8861	10.9 ± 0.5
	500	2.00	0.6 – 8.1	24.6	255.9 – 265.1	0.54 – 7.66	1058 – 9222	11.5 ± 0.4

Table S4. Summary of the reference compounds used in the relative measurements, relative rate coefficients (k_{HFE} /k_{ref}), and rate coefficients (in cm^3 $molecule^{-1}$ s^{-1}) for OH+Ref (k_{ref}) and k_{OH} for the investigated HFEs (here k_{HFE}).

HFE	Ref. compound	k_{ref} / 10^{-13}	k_{HFE} /k_{ref}	k_{HFE} / 10^{-13}	$k_{HFE\ avg}$ / 10^{-13}	Reference
$CF_3CH_2OCH_3$	$CHCl_3$	1.00±0.15 [a]	5.94±0.31	5.9±0.9	5.7±0.8	Oyaro et al. (2005)
	$CH_3C(O)CH_3$	1.80±0.45 [a]	2.87±0.30	5.2±1.4		
	C_2H_4	85.2±12.8 [b]	0.053±0.005	4.5±0.8	4.9±1.3	Østerstrøm et al. (2012)
	C_2H_2	8.45±0.85 [c]	0.63±0.05	5.3±0.4		
$CHF_2CF_2CH_2OCH_3$	$CF_3CH_2OCH_3$	5.54±0.27 [d]	1.55±0.06	8.6±0.5	8.7±0.5	Oyaro et al. (2004)
	$CHCl_3$	1.00±0.15 [a]	9.8±0.9	9.8±1.7		
$CF_3CF_2CH_2OCH_3$	$CF_3CH_2OCH_3$	5.54±0.27 [d]	1.158±0.016	6.42±0.33	6.42±0.33	Oyaro et al. (2004)
	C_2H_4	79 [e]	0.08±0.006	6.32±0.47	5.78±1.02	Thomsen et al. (2011)
	C_2H_2	7.8 [e]	0.67±0.04	5.23±0.31		

[a] Sander et al. (2003); [b] Calvert et al. (2000); [c] Sørensen et al. (2003); [d] Zhang et al. (1992) / Oyaro (submitted); [e] Atkinson et al. (2006)

Table S5. Comparison of the IR absorption peak for the investigated HFEs with previous values reported in the literature.

HFE	Resolution/ cm^{-1}	$\tilde{\nu}_{max}$/ cm^{-1}	$\sigma_{\tilde{\nu},max}$ / 10^{-18} cm^2 $molecule^{-1}$	Reference
$CF_3CH_2OCH_3$	1	1176	1.96	This work
	1	1176	1.72	Oyaro et al. (2005)
	0.25	1176	1.98	Østerstrøm et al. (2012)
$CHF_2CF_2CH_2OCH_3$	1	1131	2.12	This work
	1	1130	1.96	Oyaro et al. (2004)
$CF_3CF_2CH_2OCH_3$	1	1212	3.11	This work
	0.25	1212	3.30	Thomsen et al. (2011)
	1	1212	2.93	Oyaro et al. (2004)

Table S6. Comparison of S_{int} for the investigated HFEs with previous values reported in the literature.

HFE	Range/ cm^{-1}	S_{int}/ 10^{-16} cm^2 $molecule^{-1}$ cm^{-1}	Reference
$CF_3CH_2OCH_3$	1525-520	1.52±0.02	This work
	1525-500	1.53±0.07	Oyaro et al. (2005)
	1600-600	1.50±0.02	This work
	1600-600	1.55±0.08	Østerstrøm et al. (2012)
$CHF_2CF_2CH_2OCH_3$	1520-520	1.53±0.07	This work
	1520-500	1.39±0.02	Oyaro et al. (2004)
$CF_3CF_2CH_2OCH_3$	1500-650	2.13±0.09	This work
	1500-650	2.07±0.10	Thomsen et al. (2011)
	1525-520	2.19±0.10	This work
	1525-490	1.95±0.02	Oyaro et al. (2004)

Table S7. Lifetimes due to OH reaction, REs, and GWPs at a time horizon of 100 years for the investigated HFEs and HFCs with the same number of C-F bonds.

Species *i*	Acronym	τ_{OH}	RE_i [(a)]/ W m^{-2} $ppbv^{-1}$	$GWP_i(100\ yrs)$	Reference
$CF_3CH_2OCH_3$	HFE-263fb2	17 days	0.031	<1	This work
$CF_3CH_2CH_3$	HFC-263fb	1.1 yrs	0.100	78	Hodnebrog et al. (2020)
$CHF_2CF_2CH_2OCH_3$	HFE-374pcf	12 days	0.030	<1	This work
CHF_2CHF_2	HFC-134	10.0 yrs	0.194	1330	Hodnebrog et al. (2020)
$CF_3CF_2CH_2OCH_3$	HFE-365mcf3	13 days	0.038	<1	This work
CHF_2CF_3	HFC-125	30 yrs	0.234	3940	Hodnebrog et al. (2020)
$CF_3CF_2CH_3$	HFC-245cb	39.9 yrs	0.251	4790	Hodnebrog et al. (2020)

[(a)] Corrected with f_τ factor according to Hodnebrog et al. (2020)

SUPPLEMENTARY FIGURES

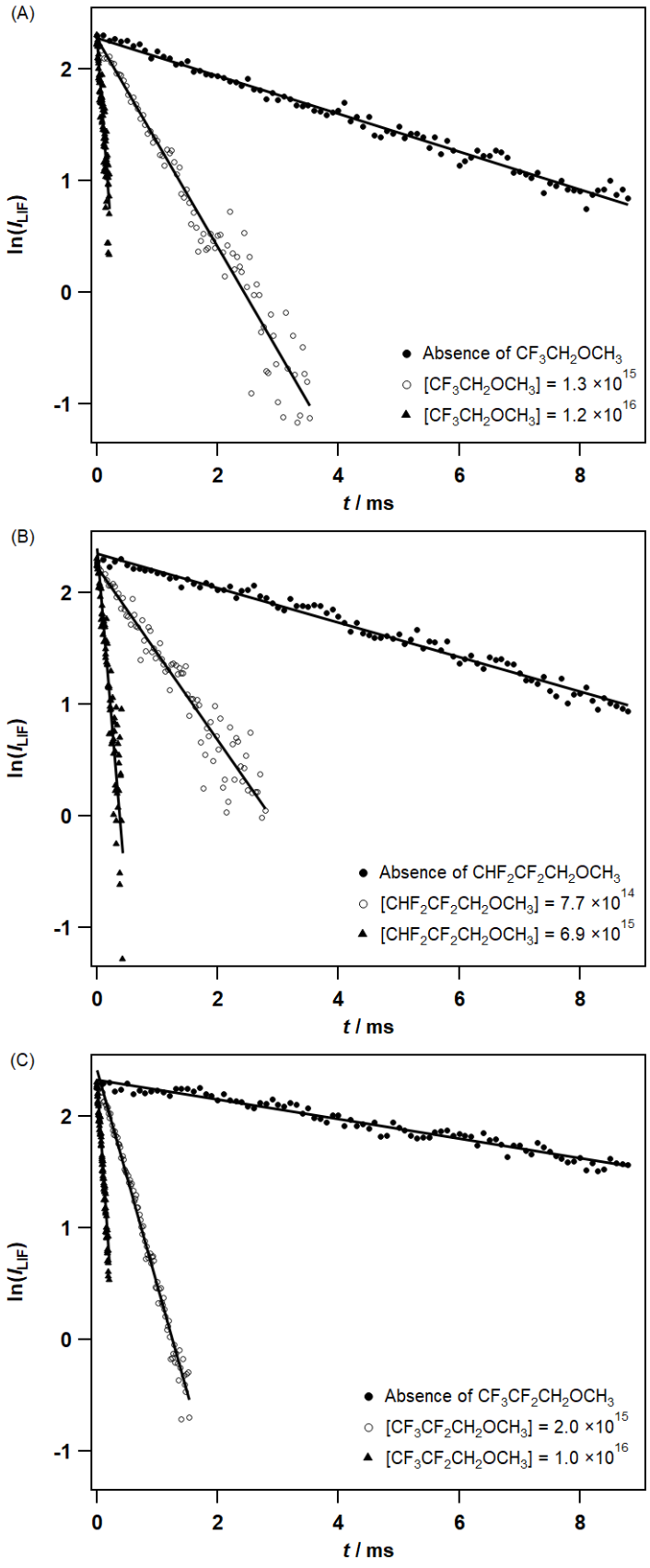

Figure S1. Plots of time evolution of I_{LIF} from OH radicals in the absence and presence of HFEs at 263 K and 50 Torr of He. Concentration of HFEs in cm^3 $molecule^{-1}$ s^{-1}.

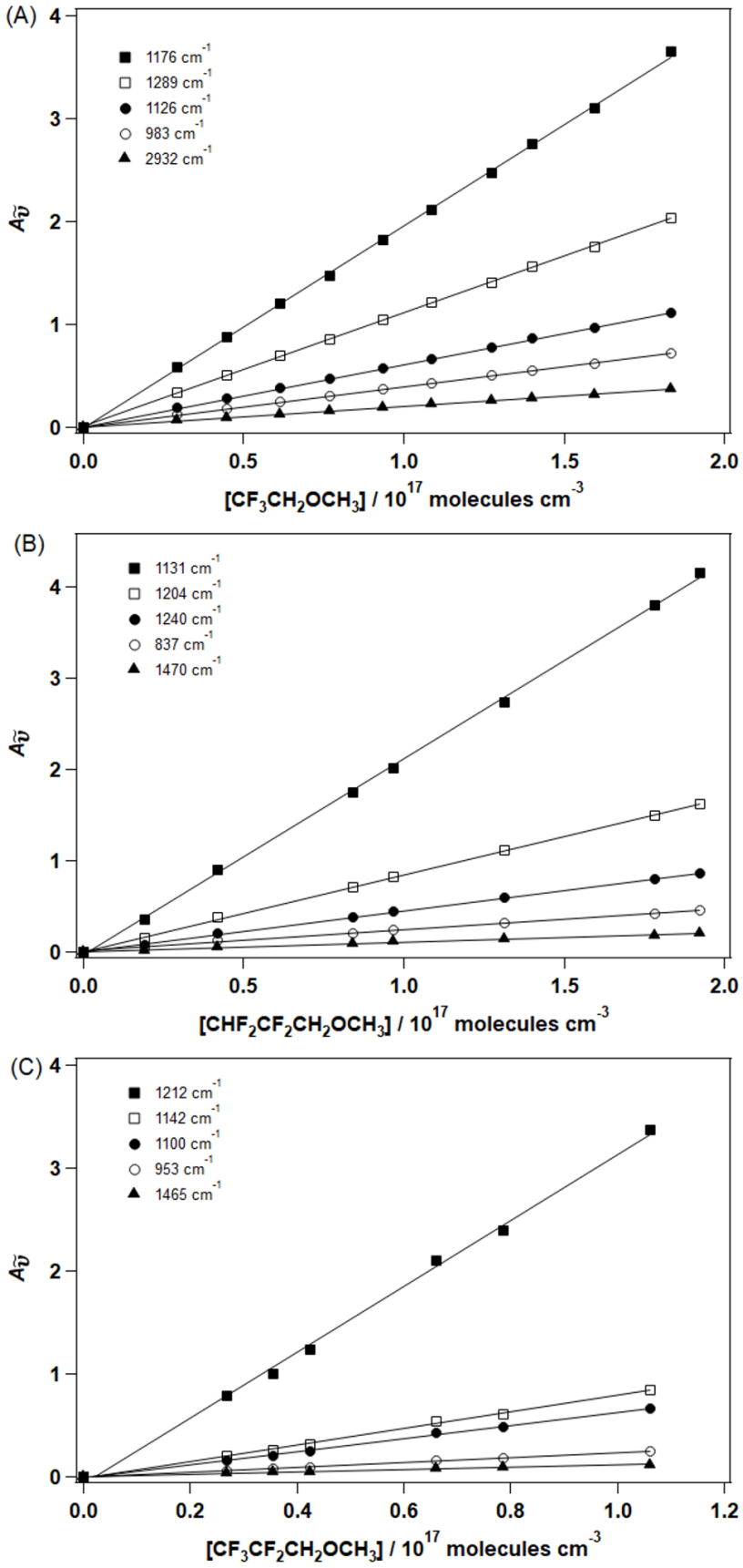

Figure S2. Plots of the Beer-Lambert's law for (A) $CF_3CH_2OCH_3$, (B) $CHF_2CF_2CH_2OCH_3$, and (C) $CF_3CF_2CH_2OCH_3$ at several wavenumbers in the investigated IR region.

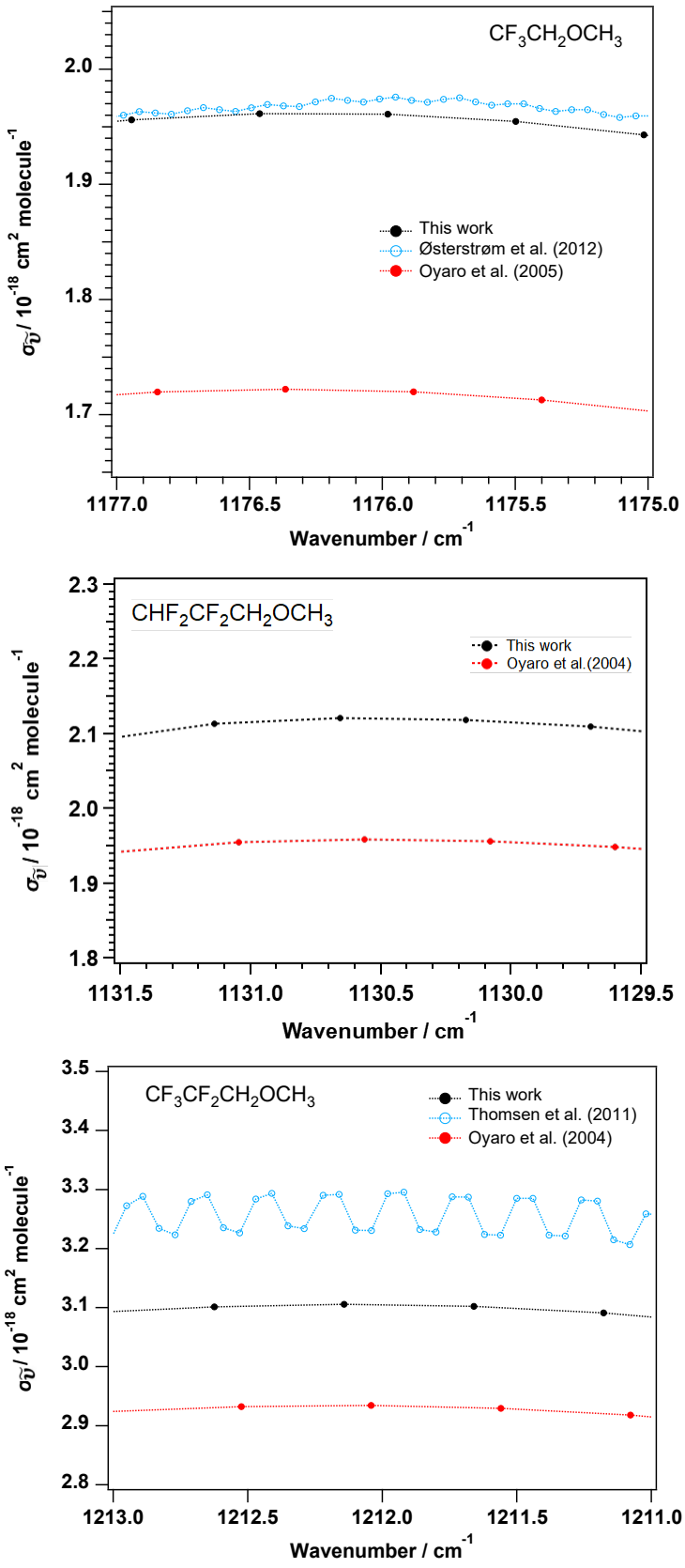

Figure S3. Zoom of the IR absorption peak for the investigated HFEs.

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