

HFC-329p

Molecular Formula: CHF₂-CF₂-CF₂-CF₃
 CAS RN: 375-17-7
 Molecular Weight: 220.04

Global Atmospheric Lifetime (years): 23.72 (32)
 Tropospheric Atmospheric Lifetime (years): 24.85 (34)
 Stratospheric Atmospheric Lifetime (years): 523 (675)

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.330	0.354 (0.31)

Global Warming Potential (GWP _H):		
GWP ₂₀		4894 (4720)
GWP ₁₀₀		2292 (2630)

Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		4551 (4565)
GTP ₅₀		2001 (2595)
GTP ₁₀₀		574 (935)

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂
 * Italic values in () taken from WMO-2018

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$k_{\text{SAR}}(298 \text{ K}) = 2.37 \times 10^{-15}$	$k_{\text{Rec}}(T) = 4.62 \times 10^{-13} \exp(-1670/T)$
$k_{\text{SAR}}(272 \text{ K}) \approx 1.51 \times 10^{-15}$	$k_{\text{Rec}}(298 \text{ K}) = 1.7 \times 10^{-15}$
	$k_{\text{Rec}}(272 \text{ K}) = 9.96 \times 10^{-16}$
$\tau_{\text{Global}}^{\text{OH}} = 17.6 \text{ years}$	
$\tau_{\text{Trop}}^{\text{OH}} = 24.85 \text{ years}$	
$\tau_{\text{Strat}}^{\text{OH}} = 609.8 \text{ years}$	

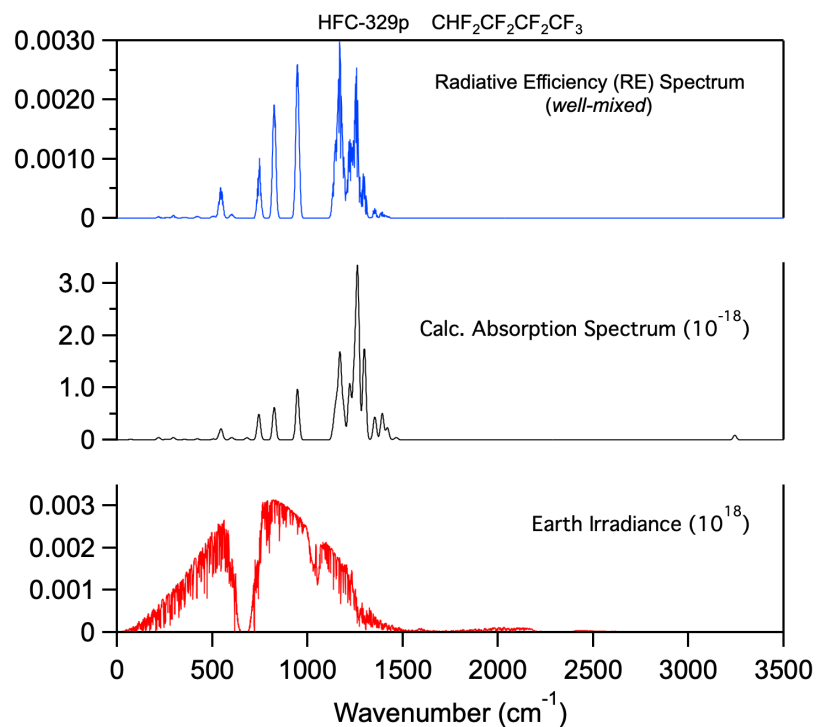
O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$k_{\text{Est}}(T) = 1.0 \times 10^{-11}$	$k_{\text{Rec}}(T) = NA$
$\tau_{\text{O}(\text{1D})} = 3700 \text{ years}$	

Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
43	0.5
69	0.6
73	0.8
128	0.5
187	0.1
218	5.7
243	0.1
260	1.9
294	4.8
302	1.1
337	0.4
356	1
378	0.2
421	2.5
505	2.1
536	6.6
547	24.1
601	5.2
612	0.8
682	5.1
744	63
825	79.6
947	124.6
1139	38.8
1152	73
1170	203.8
1189	69
1221	136.2
1246	168.4
1263	403.6
1298	224
1353	56.2
1392	64.3
1419	29.6
1465	5.7
3243	11.2

Radiative Efficiency Spectrum



HFC-329me

Molecular Formula: CF₃-CHF-CF₂-CF₃
 CAS RN: 680-17-1
 Molecular Weight: 220.04

Global Atmospheric Lifetime (years): 48.2
 Tropospheric Atmospheric Lifetime (years): 50.9
 Stratospheric Atmospheric Lifetime (years): 885

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.303	0.328
Global Warming Potential (GWP _H):		
GWP ₂₀		5515
GWP ₁₀₀		3862
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		5524
GTP ₅₀		4067
GTP ₁₀₀		2047

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.22 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 7.35 \times 10^{-16}$$

$$\tau_{\text{Global}}^{\text{OH}} = 23.9 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 50.9 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 609.8 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 1.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 3700 \text{ years}$$

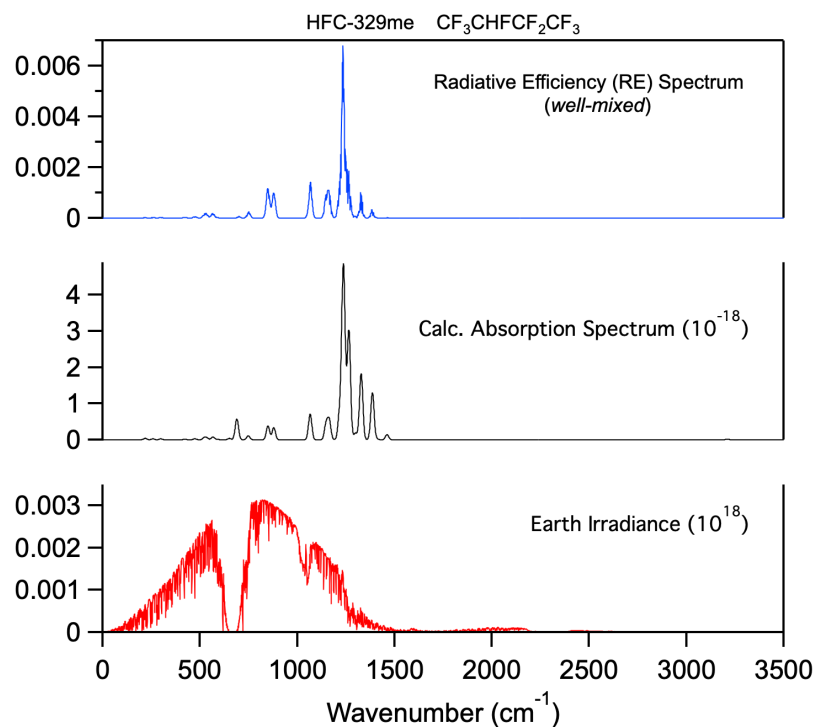
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
32	0.1
69	0.1
78	0.6
125	0.7
188	0.2
218	5.2
244	0.1
258	3.3
298	3.1
302	0.2
331	0.1
369	0
422	2.2
473	3.6
522	7.9
535	5.7
566	10
591	1.3
651	4.9
689	73.8
748	14.1
849	49
879	43.2
1066	91.4
1148	56.5
1164	67
1217	84.9
1234	273.2
1239	372.1
1265	385.1
1299	23.6
1328	235.1
1386	165.6
1410	2.6
1461	18.8
3210	2.6

Radiative Efficiency Spectrum



HFC-338q

Molecular Formula: CH₂F-CF₂-CF₂-CF₃
 CAS RN: 662-35-1
 Molecular Weight: 202.05

Global Atmospheric Lifetime (years): 14.6
 Tropospheric Atmospheric Lifetime (years): 15.3
 Stratospheric Atmospheric Lifetime (years): 325

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.260	0.276
Global Warming Potential (GWP _H):		
GWP ₂₀		3369
GWP ₁₀₀		1229
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2831
GTP ₅₀		728
GTP ₁₀₀		197

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 3.72 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 2.44 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 14.8 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 15.3 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 394.8 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 2.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1850 \text{ years}$$

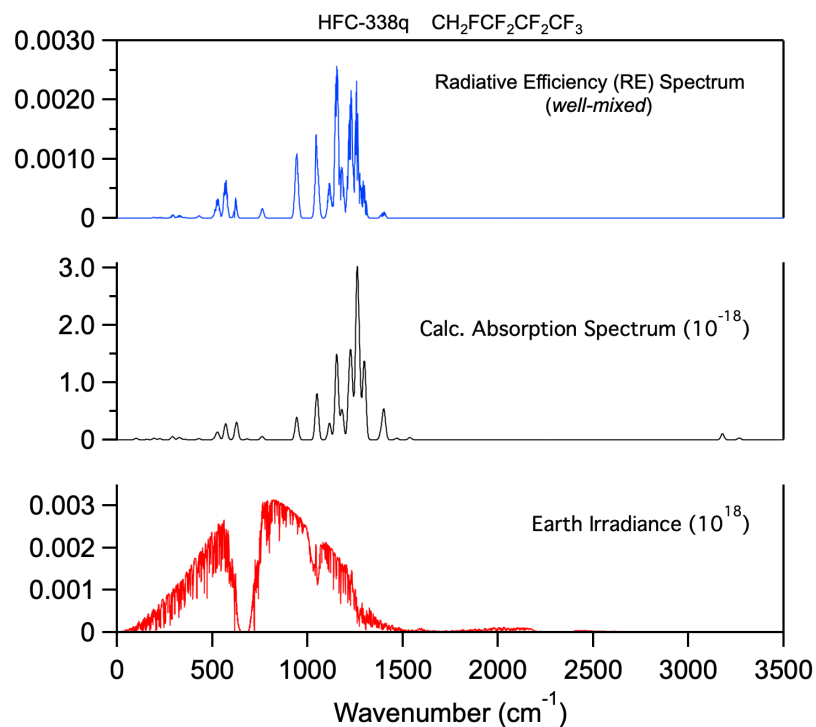
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
39	0.4
69	0.2
100	3.3
157	1.2
194	3.4
224	2.3
244	0
291	7.2
326	5.2
340	0.9
357	0.8
378	0.1
429	2.7
515	4.1
528	16.3
570	35.8
607	0.5
627	39.3
682	2
761	7.3
943	50.4
1049	104.1
1115	37.3
1153	192
1181	67.5
1220	124.5
1231	126.3
1260	355.5
1273	96.1
1298	175.6
1387	16.6
1401	64.9
1468	3.3
1537	5.4
3178	13.6
3266	4.2

Radiative Efficiency Spectrum



HFC-338mce

Molecular Formula: CHF₂-CHF-CF₂-CF₃
 CAS RN: 119450-11-6
 Molecular Weight: 202.05

Global Atmospheric Lifetime (years): 9.27
 Tropospheric Atmospheric Lifetime (years): 9.66
 Stratospheric Atmospheric Lifetime (years): 228

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.291	0.305
Global Warming Potential (GWP _H):		
GWP ₂₀		2795
GWP ₁₀₀		860
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2034
GTP ₅₀		300
GTP ₁₀₀		122

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 5.75 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.87 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 9.32 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 9.66 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 260.3 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 2.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1850 \text{ years}$$

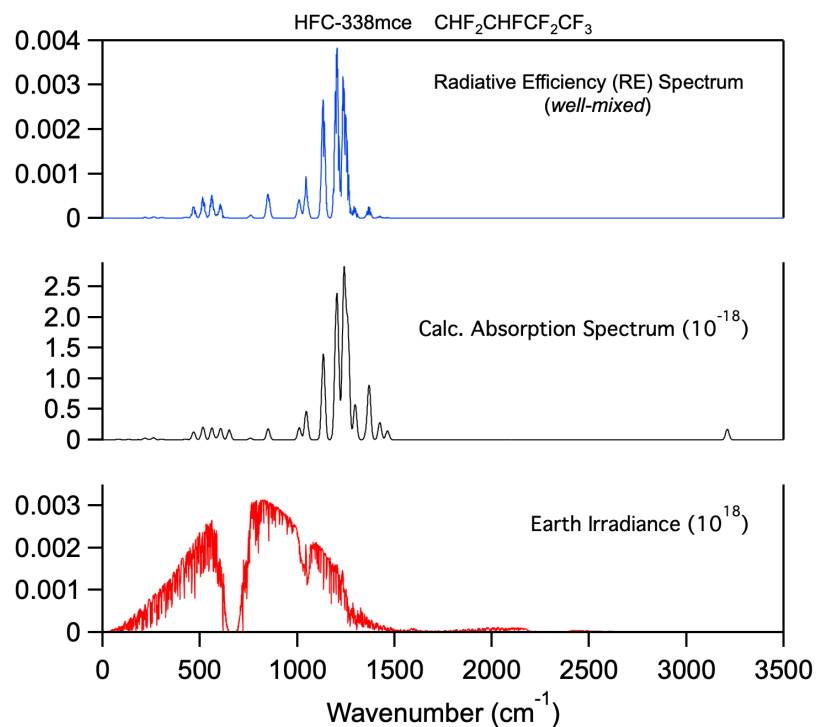
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
40	0.4
72	0.1
81	1.5
133	1.2
183	0.6
217	3.8
244	0.5
261	4.1
303	1.6
339	0.4
370	0.2
426	1.6
467	16.6
515	26.8
561	24.9
588	3.1
606	23.4
650	20.6
758	3.4
850	23.1
1010	25.5
1046	60.3
1132	80.9
1135	101.8
1198	154
1207	199.1
1240	347
1260	228.3
1297	74.3
1354	9.8
1369	112.7
1424	36.1
1463	17.6
1467	1.4
3205	4.6
3211	18.7

Radiative Efficiency Spectrum



HFC-338mec

Molecular Formula: CHF₂-CF₂-CHF-CF₃
 CAS RN: 35230-11-6
 Molecular Weight: 202.05

Global Atmospheric Lifetime (years): 11.7
 Tropospheric Atmospheric Lifetime (years): 12.2
 Stratospheric Atmospheric Lifetime (years): 274

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.306	0.322
Global Warming Potential (GWP _H):		
GWP ₂₀		3458
GWP ₁₀₀		1149
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2728
GTP ₅₀		530
GTP ₁₀₀		169

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 4.61 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.06 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 11.8 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 12.2 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 321.8 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 2.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1850 \text{ years}$$

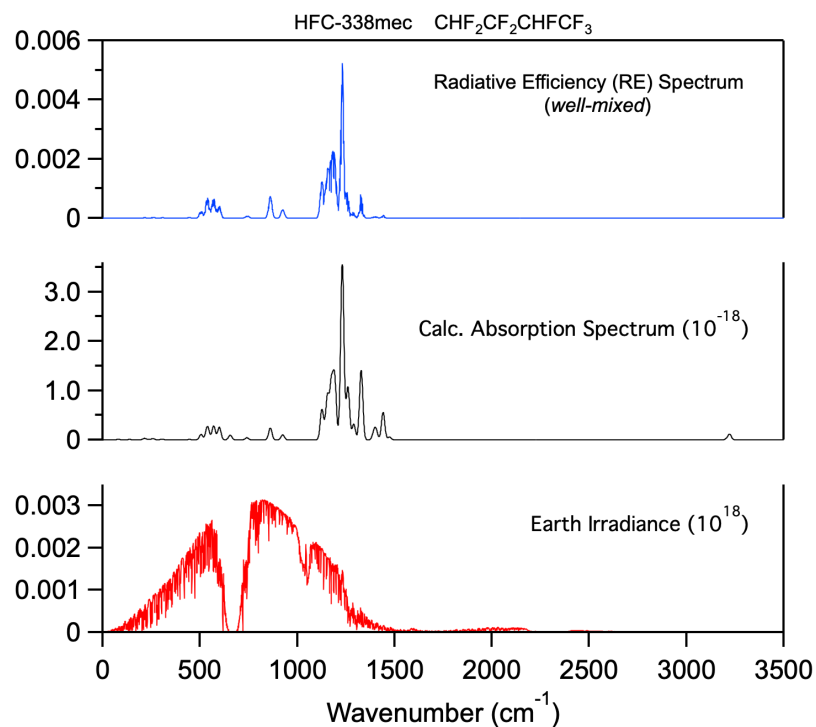
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
27	0.6
66	0.5
83	0.9
138	1
183	0.7
215	3.7
239	0.9
258	3.1
305	1.7
337	0.1
368	0.2
445	1
505	13.8
535	20.4
542	17.7
570	36.3
599	32.9
655	12.3
741	5.3
861	30.8
925	13.2
1126	77
1142	11.6
1155	108.1
1175	139.1
1192	155.9
1231	455.9
1260	137.1
1290	41
1328	181.4
1394	19
1405	21.5
1441	71.7
1474	7.2
3207	2.6
3222	14.3

Radiative Efficiency Spectrum



HFC-338pcc

Molecular Formula: CHF₂-CF₂-CF₂-CHF₂
 CAS RN: 377-36-6
 Molecular Weight: 202.05

Global Atmospheric Lifetime (years): 11.36 (13.5)
 Tropospheric Atmospheric Lifetime (years): 11.86 (14.0)
 Stratospheric Atmospheric Lifetime (years): 273 (360)

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.307	0.324
Global Warming Potential (GWP _H):		
GWP ₂₀		3407
GWP ₁₀₀		1119
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2662
GTP ₅₀		498
GTP ₁₀₀		164

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{SAR}}(298 \text{ K}) = 4.74 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.16 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 11.4 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 11.86 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 313.1 \text{ years}$$

$$k_{\text{Rec}}(T) = 7.7 \times 10^{-13} \exp(-1540/T)$$

$$k_{\text{Rec}}(298 \text{ K}) = 4.4 \times 10^{-15}$$

$$k_{\text{Rec}}(272 \text{ K}) = 2.68 \times 10^{-15}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k(T) = 1.71 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 2164 \text{ years}$$

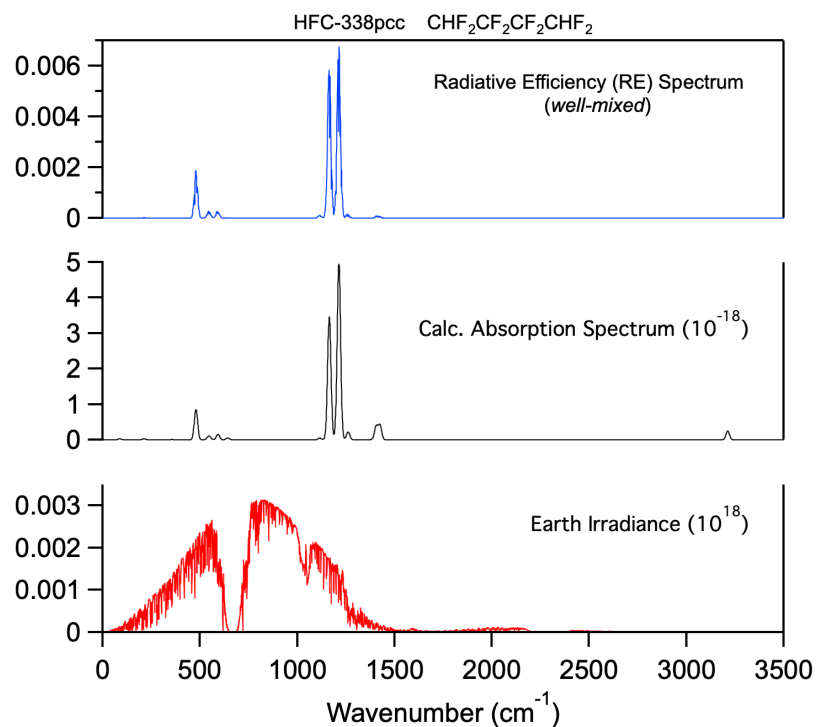
$$k_{\text{Rec}}(T) = 0.05 \times 1.8 \times 10^{-11}$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
46	0.1
83	0.4
87	3.4
144	0.7
178	0
212	3.6
235	0.2
241	0
332	0
354	1.1
368	0.2
379	0
479	109.8
486	0
545	14.4
564	0.7
592	19.7
642	6.7
694	0
765	0
1115	6.4
1137	0.1
1160	65.7
1163	26.1
1165	361.6
1206	28.9
1214	615.7
1231	3.5
1261	28.3
1392	1.6
1404	11.8
1406	37
1425	52.5
1487	0.5
3209	14.5
3214	19.2

Radiative Efficiency Spectrum



HFC-338mf

Molecular Formula: $\text{CF}_3\text{-CH}_2\text{-CF}_2\text{-CF}_3$
 CAS RN: 2924-29-0
 Molecular Weight: 202.05

Global Atmospheric Lifetime (years): 184
 Tropospheric Atmospheric Lifetime (years): 214
 Stratospheric Atmospheric Lifetime (years): 1289

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.282	0.307
Global Warming Potential (GWP _H):		
GWP ₂₀		6514
GWP ₁₀₀		7214
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		6894
GTP ₅₀		7562
GTP ₁₀₀		7115

* RE units: $\text{W m}^2 \text{ppb}^{-1}$
 * GWP and GTP: Relative to CO_2

Atmospheric Loss Processes *****

OH Reactivity ($\text{cm}^3 \text{molecule}^{-1} \text{s}^{-1}$)

$$k_{\text{Rec}}(\text{T}) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 3.24 \times 10^{-16}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.74 \times 10^{-16}$$

$$\tau_{\text{Global}}^{\text{OH}} = 204.2 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 214 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 4252 \text{ years}$$

O(¹D) Reactivity ($\text{cm}^3 \text{molecule}^{-1} \text{s}^{-1}$)

$$k_{\text{Est}}(\text{T}) = 2.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1850 \text{ years}$$

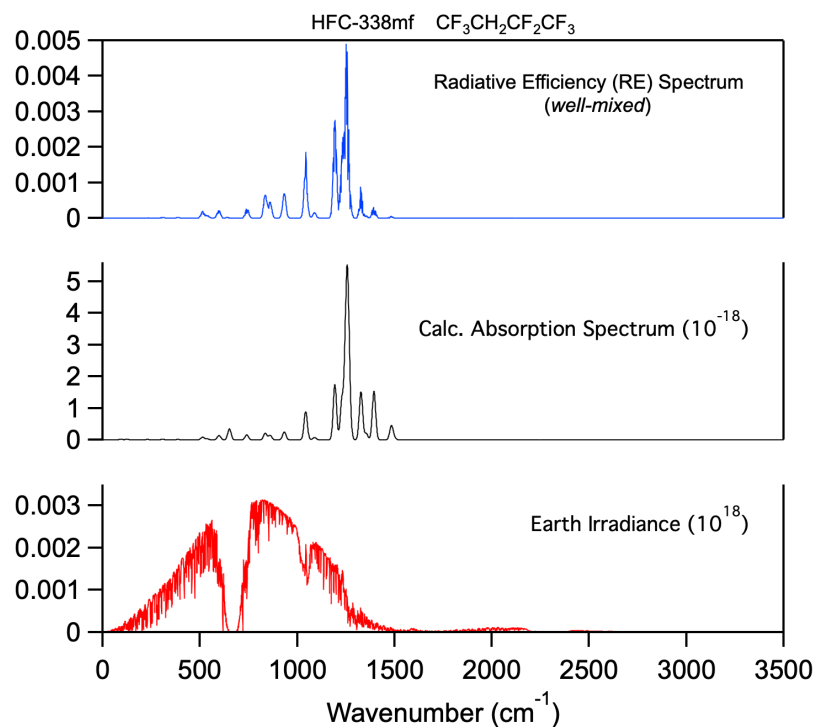
$$k_{\text{Rec}}(\text{T}) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
25	0.2
66	0.1
93	2.7
125	2.2
193	0.7
230	1.6
294	0.1
303	1
311	1.1
367	0
386	1.5
445	0.5
513	10.9
535	1.5
540	2.2
590	1.1
598	16.8
651	44.6
740	19.9
835	26.7
860	18.6
933	31.8
1043	114.3
1088	9.5
1193	224
1229	152.3
1248	244.6
1258	538.4
1269	89.8
1327	195.2
1354	25.4
1394	197.5
1483	55.5
1497	9.7
3183	0.5
3262	0.7

Radiative Efficiency Spectrum



HFC-338mee

Molecular Formula: $\text{CF}_3\text{-CHF-CHF-CF}_3$
 CAS RN: 75995-72-1
 Molecular Weight: 202.05

Global Atmospheric Lifetime (years): 11.4
 Tropospheric Atmospheric Lifetime (years): 11.9
 Stratospheric Atmospheric Lifetime (years): 269

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.321	0.338
Global Warming Potential (GWP _H):		
GWP ₂₀		3571
GWP ₁₀₀		1175
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2795
GTP ₅₀		526
GTP ₁₀₀		172

* RE units: $\text{W m}^2 \text{ppb}^{-1}$
 * GWP and GTP: Relative to CO_2

Atmospheric Loss Processes *****

OH Reactivity ($\text{cm}^3 \text{molecule}^{-1} \text{s}^{-1}$)

$$k_{\text{Rec}}(\text{T}) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 4.72 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.14 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 11.5 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 11.9 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 314.7 \text{ years}$$

O(¹D) Reactivity ($\text{cm}^3 \text{molecule}^{-1} \text{s}^{-1}$)

$$k_{\text{Est}}(\text{T}) = 2.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1850 \text{ years}$$

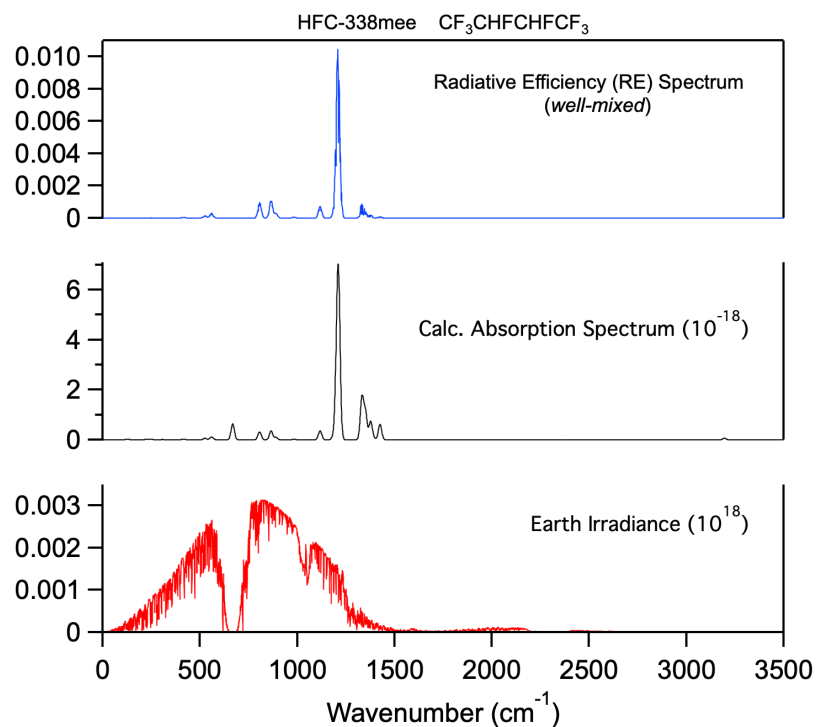
$$k_{\text{Rec}}(\text{T}) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
23	0.2
71	0.6
75	0.3
127	4.1
185	0.7
223	2.1
248	3.3
264	0.2
306	0
307	1.6
413	2.2
418	1.6
525	5.2
526	2.7
559	14.5
579	0.6
668	81.5
725	0.8
806	41
865	45.3
890	12.5
982	2.7
1117	46.3
1187	23.1
1203	217.3
1208	280.2
1213	502.3
1223	7
1332	212.8
1350	138
1377	94.6
1396	6.3
1425	79.1
1486	0.2
3191	1.2
3196	6.8

Radiative Efficiency Spectrum



HFC-347mcc

Molecular Formula: CH₃-CF₂-CF₂-CF₃
 CAS RN: 662-00-0
 Molecular Weight: 184.06

Global Atmospheric Lifetime (years): 36.8
 Tropospheric Atmospheric Lifetime (years): 39.5
 Stratospheric Atmospheric Lifetime (years): 529

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.234	0.253
Global Warming Potential (GWP _H):		
GWP ₂₀		4789
GWP ₁₀₀		2902
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		4685
GTP ₅₀		2938
GTP ₁₀₀		1191

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.54 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 9.47 \times 10^{-16}$$

$$\tau_{\text{Global}}^{\text{OH}} = 37.9 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 39.5 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 926.7 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 3.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1233 \text{ years}$$

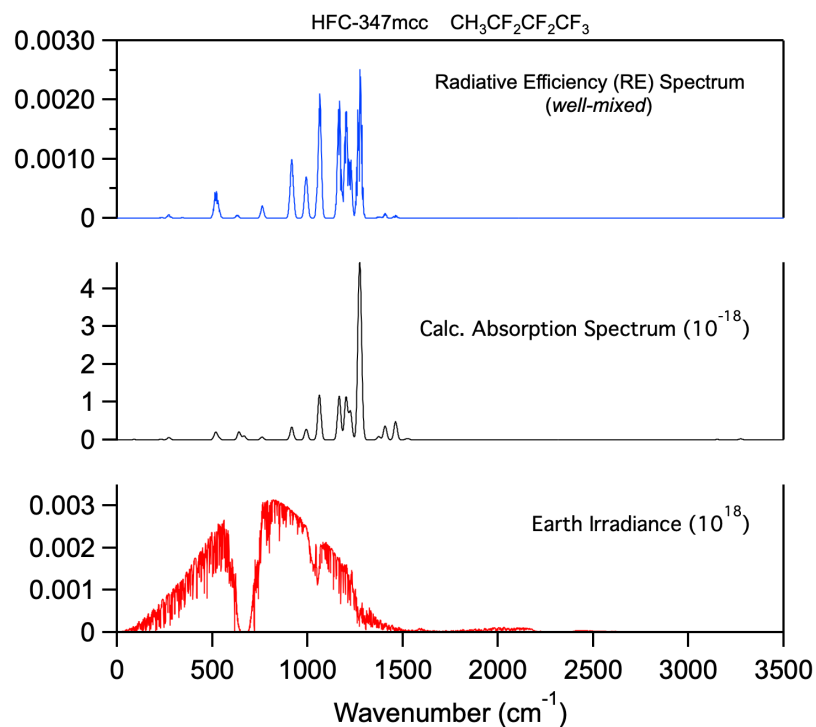
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
19	0.7
89	1.2
155	0.5
202	0.3
230	1.9
235	0
272	8
306	0
342	0.3
344	0.5
379	0
410	0
517	3.9
517	20.9
532	7.2
607	0.4
640	27.3
667	13.4
761	9.1
917	43.9
993	36
1062	152.3
1166	148.6
1202	144.1
1222	4.1
1225	90.7
1271	453.8
1280	224.9
1374	10.9
1407	47.2
1462	61.5
1518	2.2
1529	2.8
3151	1.3
3271	1.9
3278	1.4

Radiative Efficiency Spectrum



HFC-347mce

Molecular Formula: CH₂F-CHF-CF₂-CF₃
 CAS RN: 75995-85-6
 Molecular Weight: 184.06

Global Atmospheric Lifetime (years): 3.35
 Tropospheric Atmospheric Lifetime (years): 3.47
 Stratospheric Atmospheric Lifetime (years): 95

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.240	0.236
Global Warming Potential (GWP _H):		
GWP ₂₀		969
GWP ₁₀₀		264
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		432
GTP ₅₀		49
GTP ₁₀₀		37

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.52 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.08 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 3.36 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 3.47 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 103.4 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 3.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1233 \text{ years}$$

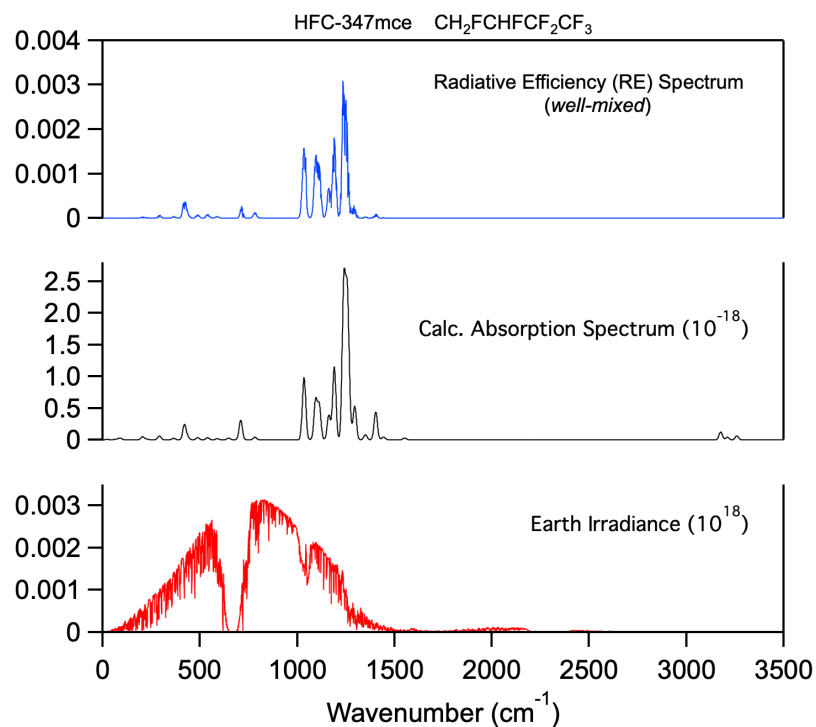
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
23	0.9
67	1.4
89	3.8
147	0.5
205	6.2
228	1.4
256	0.3
291	7.8
341	0.1
365	2.9
420	30.6
437	5
488	4.3
539	4.2
589	2.3
647	3.3
709	39.3
782	5.1
1033	73
1037	56.1
1094	78.6
1113	67.6
1162	49.4
1190	147
1239	308.6
1257	277.3
1270	25.3
1295	67.3
1350	10.3
1403	56.2
1443	5.9
1478	0.3
1552	3.6
3176	15.9
3210	5.1
3259	8.1

Radiative Efficiency Spectrum



HFC-347mec

Molecular Formula: CH₂F-CF₂-CHF-CF₃
 CAS RN: 53005-35-9
 Molecular Weight: 184.06

Global Atmospheric Lifetime (years): 4.22
 Tropospheric Atmospheric Lifetime (years): 4.37
 Stratospheric Atmospheric Lifetime (years): 116

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.264	0.264
Global Warming Potential (GWP _H):		
GWP ₂₀		1357
GWP ₁₀₀		372
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		679
GTP ₅₀		73
GTP ₁₀₀		52

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.22 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 8.56 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 4.23 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 4.37 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 127.5 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 3.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1233 \text{ years}$$

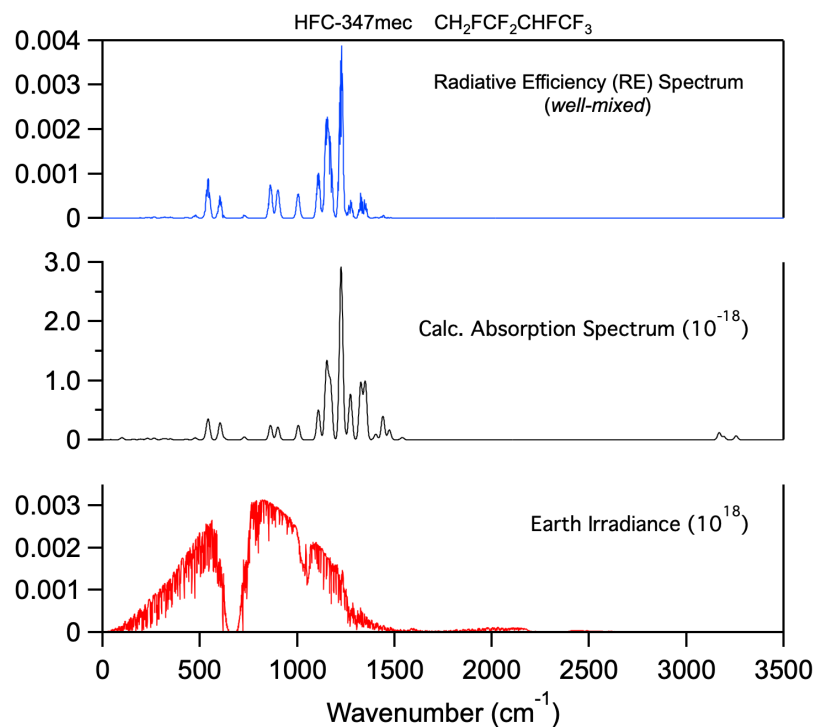
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
41	0.6
67	0.4
99	4.6
158	1.3
195	1.8
230	3.4
264	3.6
307	1.7
324	2
348	1.9
429	1.3
475	4.2
530	5.7
542	43.5
603	36.9
624	3.2
727	5.9
862	31.4
900	27.7
1005	31.1
1108	64.2
1150	153.1
1159	20.4
1171	113.9
1225	374.4
1242	10.6
1273	99.6
1326	121.9
1349	124.6
1403	11.9
1440	51.5
1473	21.1
1539	5.1
3168	15.4
3192	7.1
3255	8.7

Radiative Efficiency Spectrum



HFC-347pcc

Molecular Formula: CH₂F-CF₂-CF₂-CHF₂
 CAS RN: 119450-61-2
 Molecular Weight: 184.06

Global Atmospheric Lifetime (years): 8.70
 Tropospheric Atmospheric Lifetime (years): 9.08
 Stratospheric Atmospheric Lifetime (years): 205

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.275	0.287
Global Warming Potential (GWP _H):		
GWP ₂₀		2759
GWP ₁₀₀		834
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		1958
GTP ₅₀		271
GTP ₁₀₀		118

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 6.10 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 4.12 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 8.76 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 9.08 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 246.2 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 3.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1233 \text{ years}$$

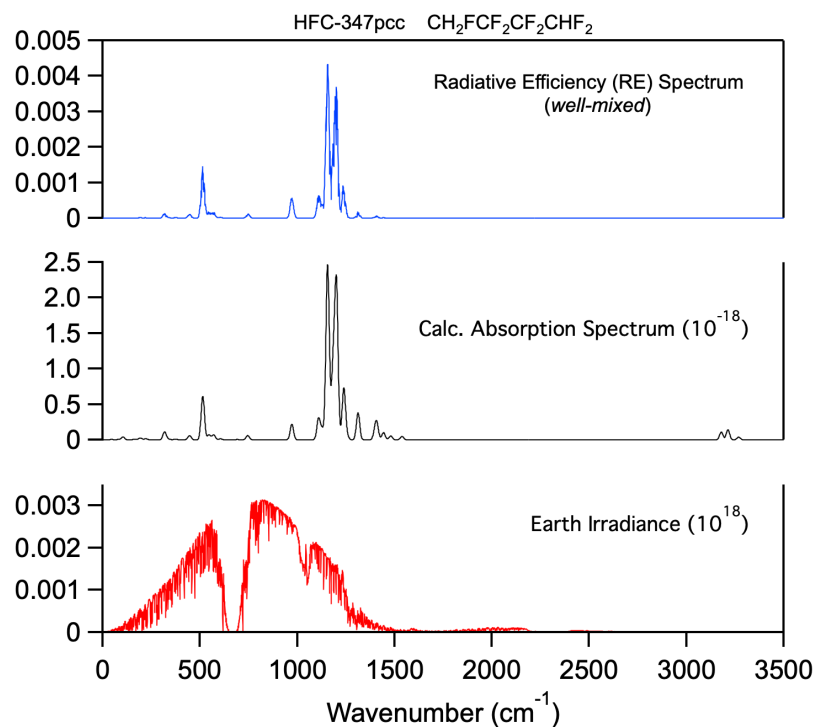
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
45	0.7
81	0.7
104	5.2
162	0.9
193	3.4
221	1.9
241	0.1
318	14.6
340	1
372	0.4
375	0.8
446	7.5
514	79.2
546	8.9
570	8.8
605	1.8
691	0.6
745	7.5
972	28
1109	37.9
1127	18.5
1155	292
1160	28.3
1184	131.6
1201	278
1239	93.3
1256	6.6
1312	48.6
1399	14.3
1409	26.4
1443	13
1480	6.9
1538	6.1
3179	14.2
3213	18.4
3268	4.8

Radiative Efficiency Spectrum



HFC-347mcf

Molecular Formula: CHF₂-CH₂-CF₂-CF₃
 CAS RN: 161791-36-2
 Molecular Weight: 184.06

Global Atmospheric Lifetime (years): 8.64
 Tropospheric Atmospheric Lifetime (years): 9.02
 Stratospheric Atmospheric Lifetime (years): 204

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.312	0.326
Global Warming Potential (GWP _H):		
GWP ₂₀		3115
GWP ₁₀₀		940
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2205
GTP ₅₀		303
GTP ₁₀₀		133

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 6.14 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 4.15 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 8.70 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 9.02 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 244.7 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 3.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1233 \text{ years}$$

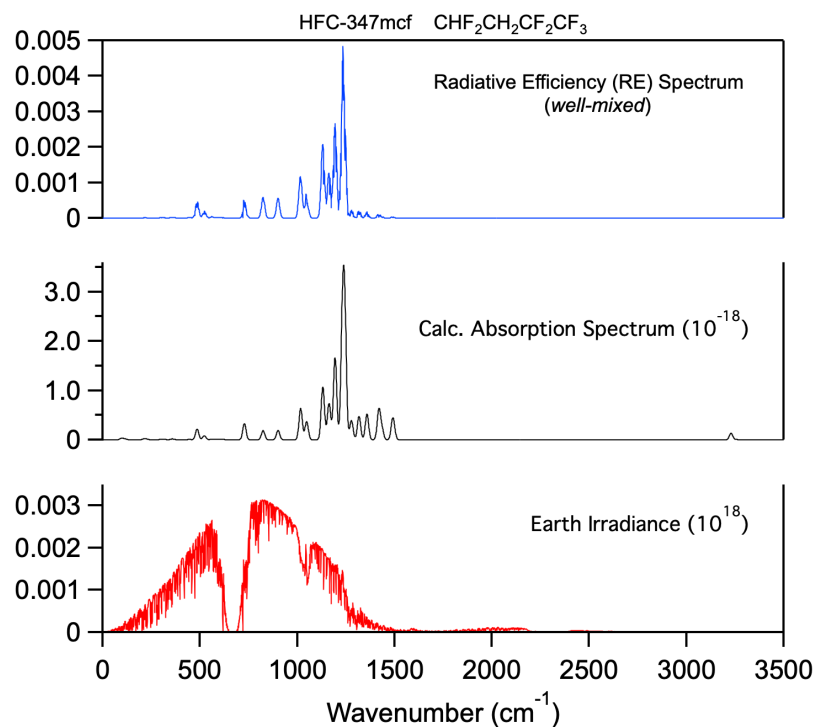
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
25	0.7
67	0.2
98	4.6
117	2.1
213	2.7
229	1.4
301	1.7
321	0.8
356	2
369	0.7
445	1.1
485	27.6
522	10.7
562	2.1
590	1.2
616	1.7
728	41.6
824	24
901	24.1
1017	81.3
1048	47.2
1131	137.5
1163	94.7
1194	213.8
1232	286.3
1244	296.3
1278	49.9
1317	60.9
1358	67.1
1419	76.9
1435	26.6
1490	49.2
1498	12.4
3174	0.2
3229	17.5
3255	0.9

Radiative Efficiency Spectrum



HFC-347mee

Molecular Formula: CHF₂-CHF-CHF-CF₃
 CAS RN: 151868-61-0
 Molecular Weight: 184.06

Global Atmospheric Lifetime (years): 5.00
 Tropospheric Atmospheric Lifetime (years): 5.20
 Stratospheric Atmospheric Lifetime (years): 133

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.293	0.298
Global Warming Potential (GWP _H):		
GWP ₂₀		1795
GWP ₁₀₀		497
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		981
GTP ₅₀		104
GTP ₁₀₀		69

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.03 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 7.20 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 5.02 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 5.20 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 148.9 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 3.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1233 \text{ years}$$

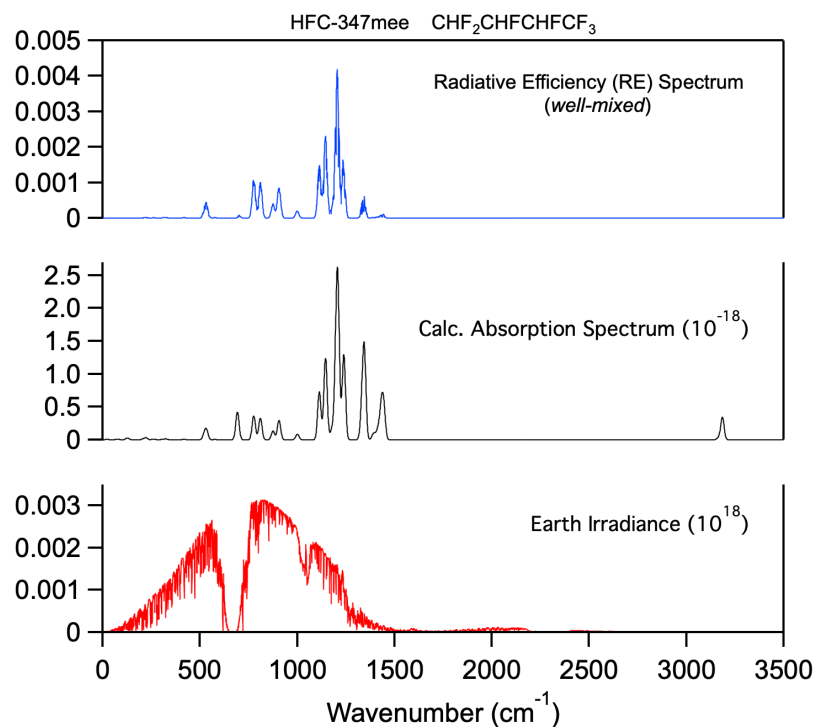
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
22	1
74	0.3
76	1.3
127	3.7
209	1.7
223	3.5
259	1
267	0.6
308	1
325	1.6
418	0.9
522	9.9
533	17.4
577	0.7
692	54
776	46.8
810	42.2
875	17.3
906	38
1000	10.9
1113	93.3
1145	159.2
1178	20.1
1198	107.7
1208	275.9
1239	166.3
1332	52.5
1344	169.3
1392	12.5
1413	18.6
1431	60.3
1444	63.1
1486	0.3
3163	3.3
3177	3.1
3185	41.9

Radiative Efficiency Spectrum



HFC-347pce

Molecular Formula: CHF₂-CHF-CF₂-CHF₂
 CAS RN: 119450-64-5
 Molecular Weight: 184.06

Global Atmospheric Lifetime (years): 6.43
 Tropospheric Atmospheric Lifetime (years): 6.70
 Stratospheric Atmospheric Lifetime (years): 162

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.280	0.288
Global Warming Potential (GWP _H):		
GWP ₂₀		2176
GWP ₁₀₀		620
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		1351
GTP ₅₀		151
GTP ₁₀₀		87

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 8.12 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 5.59 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 6.47 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 6.70 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 187.2 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 3.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1233 \text{ years}$$

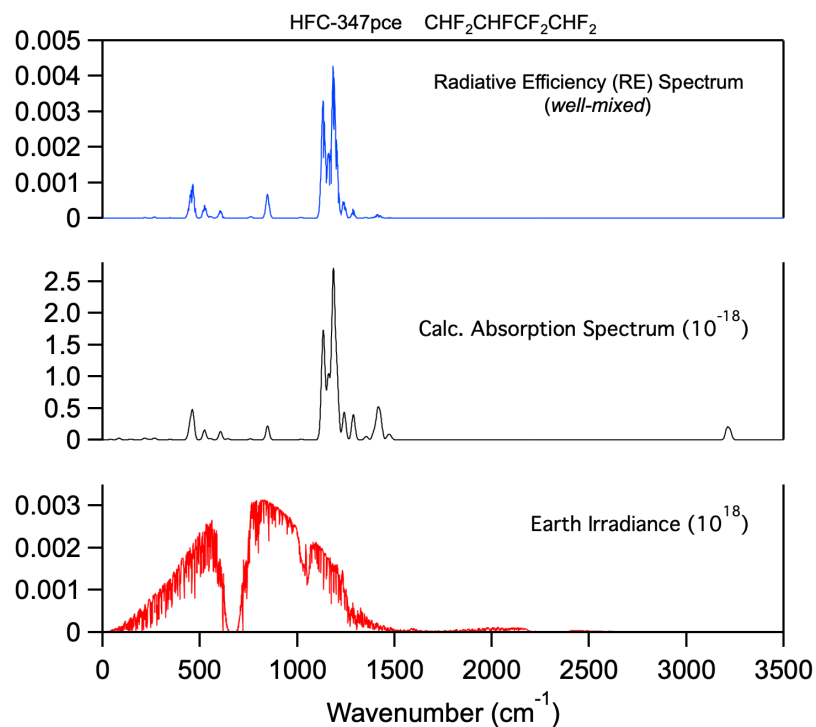
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
41	1
80	0.9
85	2.4
144	1.6
180	0.2
216	3.5
238	0.7
266	3.9
346	0.9
369	0.2
447	23.8
462	55.7
523	19.6
554	2.3
605	16.8
643	2.2
759	1.9
847	27.7
1020	1.3
1122	12
1130	68.4
1135	156
1160	127.1
1185	335.4
1204	125.8
1241	55.8
1288	51.4
1354	7
1394	16.3
1413	54.8
1428	40.7
1466	7.5
1478	7.2
3202	4.3
3210	19.7
3225	16.3

Radiative Efficiency Spectrum



HFC-347mfc

Molecular Formula: CHF₂-CF₂-CH₂-CF₃
 CAS RN: 119450-65-6
 Molecular Weight: 184.06

Global Atmospheric Lifetime (years): 14.6
 Tropospheric Atmospheric Lifetime (years): 15.4
 Stratospheric Atmospheric Lifetime (years): 300

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.290	0.308
Global Warming Potential (GWP _H):		
GWP ₂₀		4118
GWP ₁₀₀		1502
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		3459
GTP ₅₀		888
GTP ₁₀₀		241

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 3.72 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 2.43 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 14.8 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 15.4 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 395.7 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 3.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 1233 \text{ years}$$

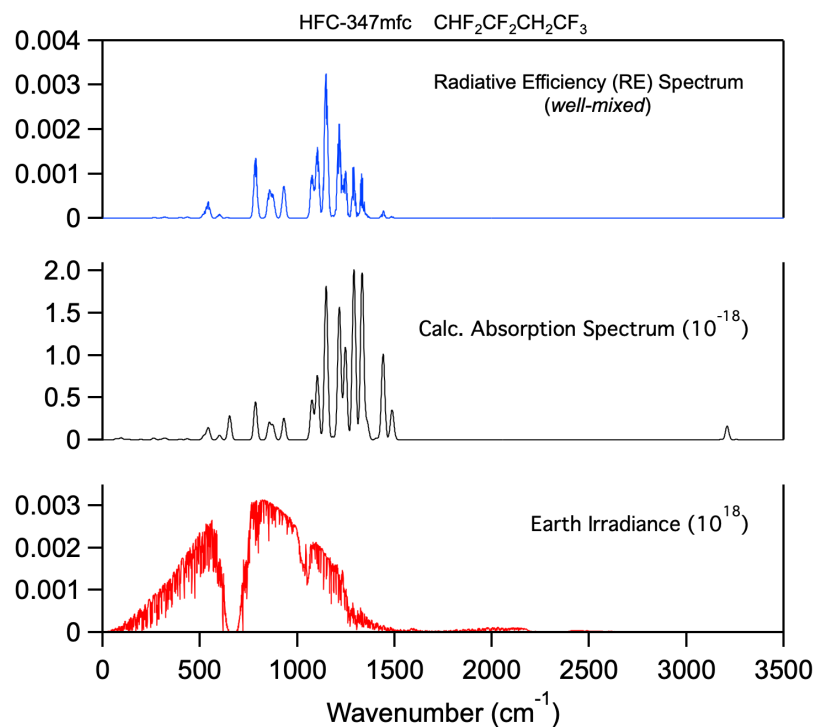
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
36	0.2
71	2
95	3
129	1.2
196	0.7
262	2.6
297	0.6
311	0.8
321	2.3
398	1
434	1.6
520	6.2
535	2.6
543	16.8
600	6.9
652	36.7
785	57.4
855	25.4
875	21
931	33
1075	60
1103	97.9
1148	233.5
1182	4.5
1216	201.6
1247	140.1
1291	259
1333	253.4
1359	26.3
1408	2.6
1441	130.4
1486	41.7
1495	6.2
3176	0.5
3209	21
3256	0.6

Radiative Efficiency Spectrum



HFC-347mef

Molecular Formula: $\text{CF}_3\text{-CH}_2\text{-CHF-CF}_3$
 CAS RN: 86884-16-4
 Molecular Weight: 184.06

Global Atmospheric Lifetime (years): 8.53
 Tropospheric Atmospheric Lifetime (years): 8.90
 Stratospheric Atmospheric Lifetime (years): 202

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.305	0.318
Global Warming Potential (GWP _H):		
GWP ₂₀		3010
GWP ₁₀₀		906
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2119
GTP ₅₀		288
GTP ₁₀₀		128

* RE units: $\text{W m}^2 \text{ppb}^{-1}$
 * GWP and GTP: Relative to CO_2

Atmospheric Loss Processes *****

OH Reactivity ($\text{cm}^3 \text{molecule}^{-1} \text{s}^{-1}$)

$$k_{\text{Rec}}(\text{T}) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 6.21 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 4.20 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 8.59 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 8.90 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 241.9 \text{ years}$$

O(¹D) Reactivity ($\text{cm}^3 \text{molecule}^{-1} \text{s}^{-1}$)

$$k_{\text{Est}}(\text{T}) = 3.0 \times 10^{-11}$$

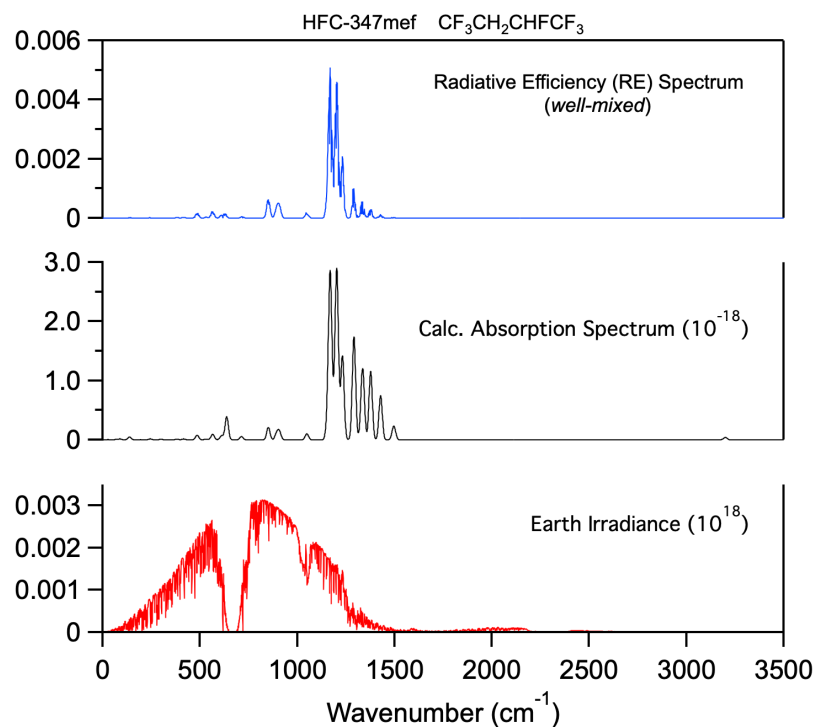
$$\tau_{\text{O}(\text{1D})} = 1233 \text{ years}$$

$$k_{\text{Rec}}(\text{T}) = NA$$

Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
27	0.6
65	0.6
88	1.9
138	5.9
193	0.6
244	1.9
299	1.2
311	0
381	1.4
416	1.8
485	9.8
530	0.7
533	1
565	12.1
611	8.8
637	50
713	7
851	26.9
894	14
908	17.1
1049	13.1
1156	45.5
1169	351.5
1190	45.4
1203	357.9
1232	180.9
1291	224
1332	68.7
1338	96
1377	148.3
1428	96.3
1492	11.6
1498	20.4
3174	0.3
3200	5.4
3255	0

Radiative Efficiency Spectrum



HFC-356mce

Molecular Formula: CH₃-CHF-CF₂-CF₃
 CAS RN: 161791-32-8
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 2.25
 Tropospheric Atmospheric Lifetime (years): 2.33
 Stratospheric Atmospheric Lifetime (years): 67

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.217	0.204
Global Warming Potential (GWP _H):		
GWP ₂₀		626
GWP ₁₀₀		170
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		239
GTP ₅₀		30
GTP ₁₀₀		24

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 2.21 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.60 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 2.26 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 2.33 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 72.4 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

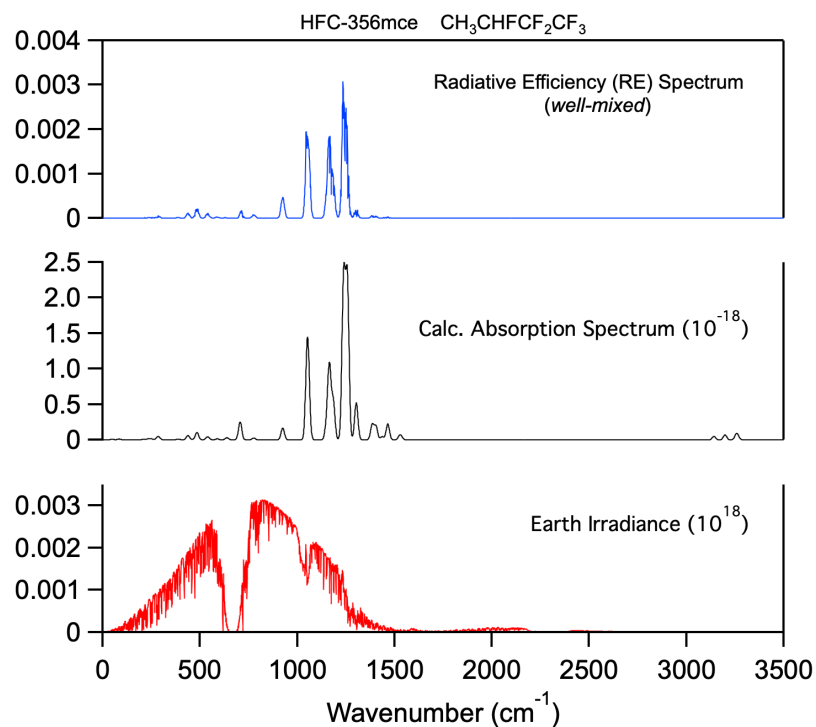
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
49	1.1
84	1.5
154	0.1
212	1.3
235	1.8
252	1.4
285	6.3
313	0.2
351	0.4
388	1.4
438	7.6
484	13.4
539	5.5
589	1.7
638	3.7
706	32.4
776	3.2
925	21.4
1051	146.6
1058	51.7
1151	27.7
1165	129.6
1185	67.7
1238	289.7
1257	285.1
1303	66.6
1385	27
1404	24
1436	5.6
1465	28.6
1526	6.1
1534	4.2
3141	6.3
3198	9.1
3254	6.4
3263	6.9

Radiative Efficiency Spectrum



HFC-356mec

Molecular Formula: CH₃-CF₂-CHF-CF₃
 CAS RN: 76523-97-2
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 13.9
 Tropospheric Atmospheric Lifetime (years): 14.6
 Stratospheric Atmospheric Lifetime (years): 268

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.237	0.251
Global Warming Potential (GWP _H):		
GWP ₂₀		3623
GWP ₁₀₀		1290
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		3001
GTP ₅₀		720
GTP ₁₀₀		201

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 3.90 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 2.56 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 14.1 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 14.6 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 377.9 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

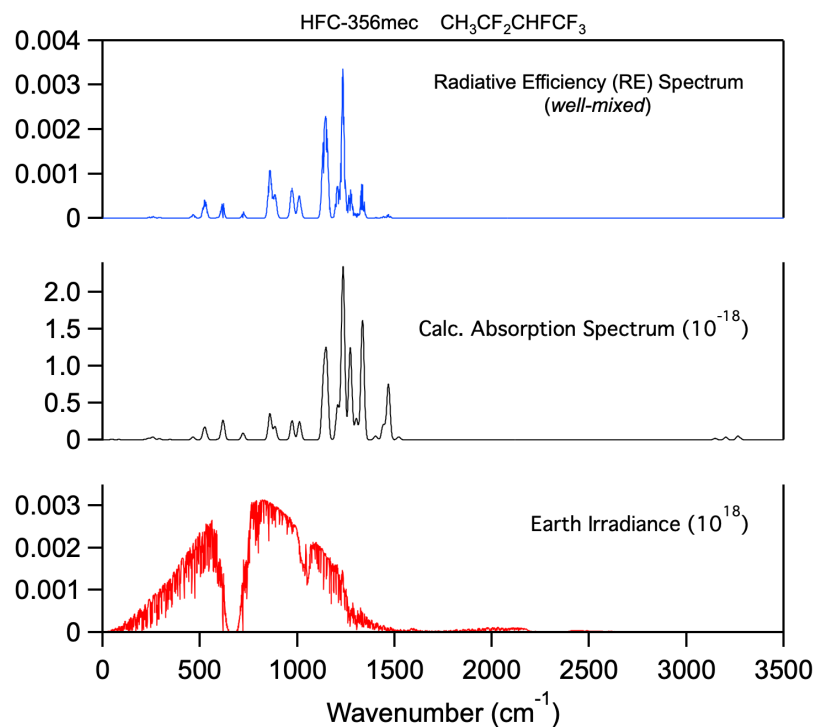
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
47	1
83	0.6
156	0.4
218	0.7
237	2.7
258	4.7
290	1.9
312	0.1
345	0.6
408	0.3
464	4.9
521	15.1
529	9.7
596	1
618	34
721	11.9
859	45.4
885	22.8
973	33.3
1011	31.4
1134	96.8
1150	139.1
1207	59.3
1235	300.4
1272	160.2
1303	37
1335	207.9
1402	6.4
1442	26.2
1468	96.6
1519	3.8
1525	1.5
3147	2.4
3202	4.5
3263	5.9
3277	1.9

Radiative Efficiency Spectrum



HFC-356pcc

Molecular Formula: CH₃-CF₂-CF₂-CHF₂
 CAS RN: 119450-97-2
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 10.8
 Tropospheric Atmospheric Lifetime (years): 11.4
 Stratospheric Atmospheric Lifetime (years): 228

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.249	0.262
Global Warming Potential (GWP _H):		
GWP ₂₀		3254
GWP ₁₀₀		1051
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2503
GTP ₅₀		442
GTP ₁₀₀		152

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 4.93 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.29 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 11.0 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 11.4 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 301.7 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

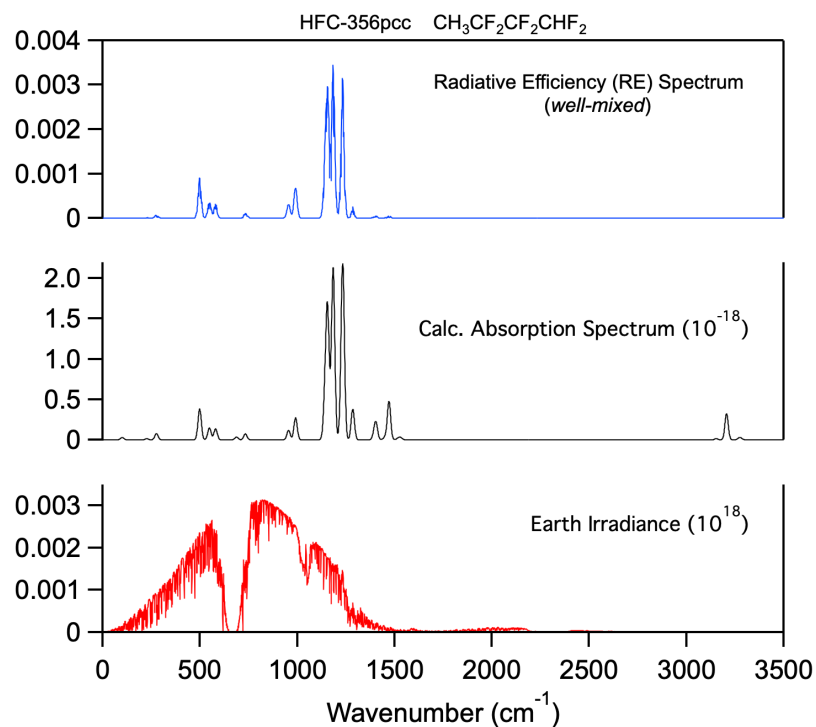
$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

$$k_{\text{Rec}}(T) = NA$$

Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
100	3.7
160	0.3
198	0.1
225	1.3
230	0.4
276	9.8
340	0.1
354	0.1
374	0.4
436	0.2
498	48.9
548	18.9
566	0
580	17.6
687	4.4
733	9.3
955	14.9
991	34.7
1142	57.5
1155	193.9
1161	8
1184	273.2
1228	42.2
1234	246.8
1285	48.6
1396	10.7
1405	22.1
1450	4
1471	60.8
1518	2.4
1531	3.2
3153	1.8
3206	20.7
3271	2.6
3280	1.9
3206	20.7

Radiative Efficiency Spectrum



HFC-356mcf

Molecular Formula: CH₂F-CH₂-CF₂-CF₃
 CAS RN: 161791-33-9
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 1.38 (1.2)
 Tropospheric Atmospheric Lifetime (years): 1.43 (1.26)
 Stratospheric Atmospheric Lifetime (years): 44.4 (40)

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.246	0.214
Global Warming Potential (GWP _H):		
GWP ₂₀		404
GWP ₁₀₀		110
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		137
GTP ₅₀		19
GTP ₁₀₀		15

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{SAR}}(298 \text{ K}) = 3.53 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 2.62 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.39 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.43 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 46.5 \text{ years}$$

$$k_{\text{Rec}}(T) = 1.7 \times 10^{-12} \exp(-1100/T)$$

$$k_{\text{Rec}}(298 \text{ K}) = 4.2 \times 10^{-14}$$

$$k_{\text{Rec}}(272 \text{ K}) = 2.98 \times 10^{-14}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

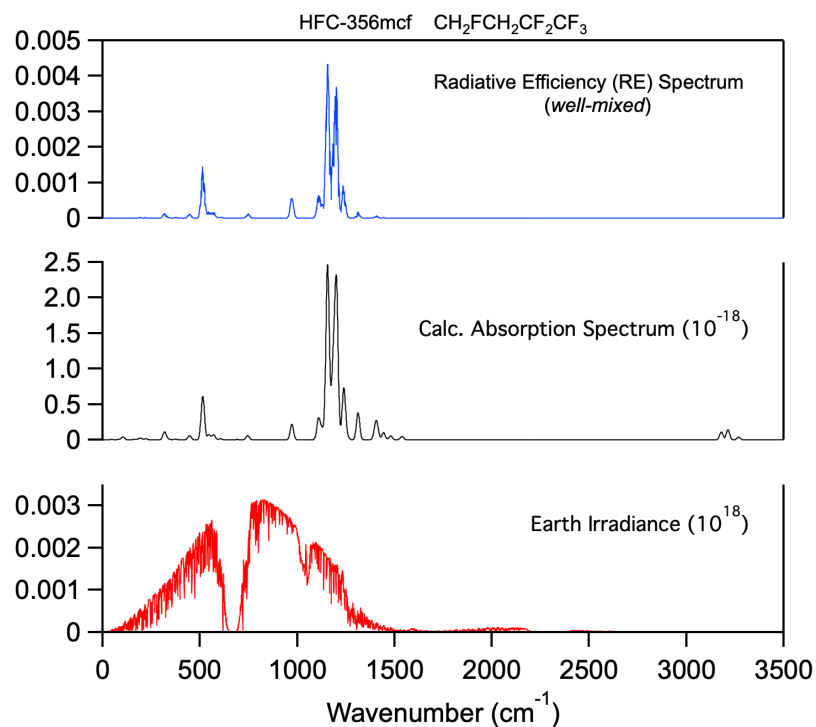
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
27	4
72	0.8
113	3.1
160	0.4
227	1.9
257	4.4
302	1.9
347	1.9
368	0.1
444	1.8
459	24.7
518	8.8
589	0.7
589	1.5
702	20.2
775	3.4
883	23.2
1001	6.3
1030	70.5
1053	29.6
1134	153.9
1177	129.1
1227	273.2
1243	331.2
1278	12.7
1286	42.5
1332	57.9
1403	77.2
1446	6.7
1470	16.1
1496	8.5
1553	2
3158	2.2
3166	29.7
3234	2.9
3244	14.3

Radiative Efficiency Spectrum



HFC-356mee

Molecular Formula: CH₂F-CHF-CHF-CF₃
 CAS RN: 119450-67-8
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 2.21
 Tropospheric Atmospheric Lifetime (years): 2.28
 Stratospheric Atmospheric Lifetime (years): 66

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.234	0.220
Global Warming Potential (GWP _H):		
GWP ₂₀		661
GWP ₁₀₀		180
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		251
GTP ₅₀		32
GTP ₁₀₀		25

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 2.25 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.64 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 2.21 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 2.28 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 71.0 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

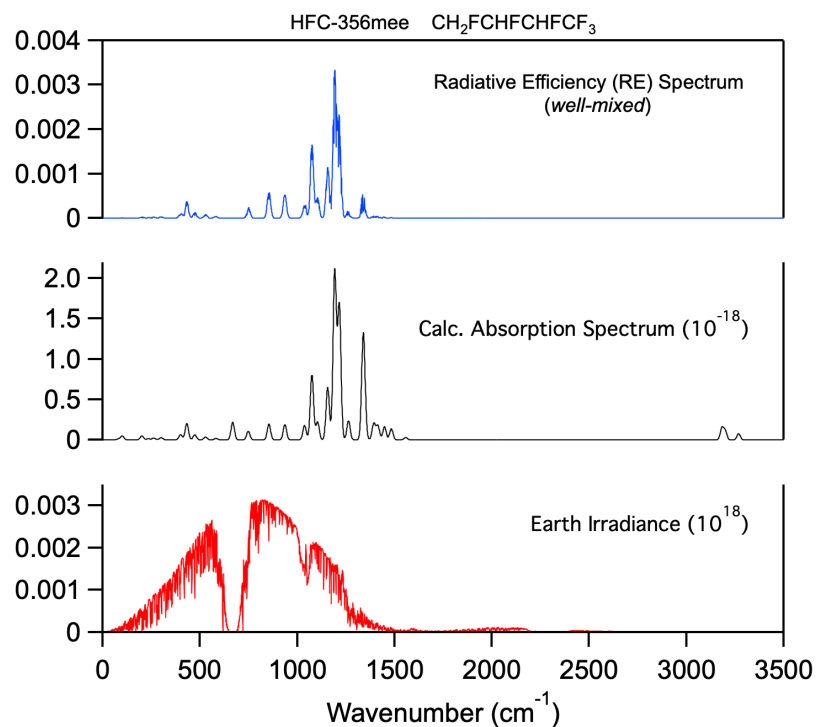
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
38	0.3
80	1.3
100	6.2
163	0.1
201	6.3
234	1.9
262	2.9
300	3.5
400	8.2
432	26
473	8
528	4.3
582	2.2
668	27.7
748	13.6
854	25.2
936	24.1
1037	22.8
1075	102.7
1104	28.6
1156	83.1
1192	263.6
1201	7.9
1216	211.1
1263	30.2
1339	165.9
1350	10.9
1393	26.4
1414	22.4
1448	20.7
1483	17.6
1557	3.7
3182	18.2
3191	0.2
3199	13.9
3268	9.9

Radiative Efficiency Spectrum



HFC-356pce

Molecular Formula: CH₂F-CHF-CF₂-CHF₂
 CAS RN: 119450-67-8
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 2.87
 Tropospheric Atmospheric Lifetime (years): 2.98
 Stratospheric Atmospheric Lifetime (years): 82

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.227	0.220
Global Warming Potential (GWP _H):		
GWP ₂₀		859
GWP ₁₀₀		234
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		358
GTP ₅₀		43
GTP ₁₀₀		32

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.75 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.26 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 2.88 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 2.98 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 90.1 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

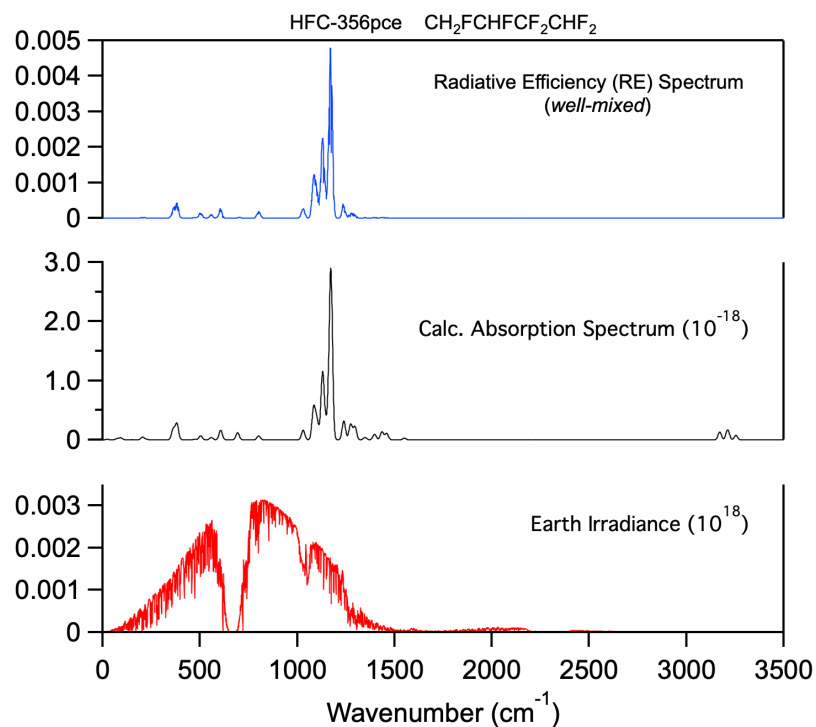
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
24	1.1
75	2.8
93	4
151	0.6
204	5.7
222	1.4
254	0.5
346	0.1
362	22.7
381	34.4
473	1
503	8.6
558	5
606	20.6
693	15.4
801	8.2
1030	21.1
1084	69.3
1101	40.4
1130	146.4
1150	26.5
1159	11.5
1172	368
1239	40.9
1274	33.8
1296	28.1
1348	5
1397	12.3
1435	17.4
1459	13.7
1477	0.2
1550	3.6
3171	17
3207	5.6
3213	17.5
3254	9.4

Radiative Efficiency Spectrum



HFC-356mfc

Molecular Formula: CH₂F-CF₂-CH₂-CF₃
 CAS RN: 76546-55-9
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 4.84
 Tropospheric Atmospheric Lifetime (years): 5.03
 Stratospheric Atmospheric Lifetime (years): 125

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.246	0.249
Global Warming Potential (GWP _H):		
GWP ₂₀		1611
GWP ₁₀₀		445
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		866
GTP ₅₀		92
GTP ₁₀₀		62

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.06 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 7.44 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 4.86 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 5.03 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 144.6 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

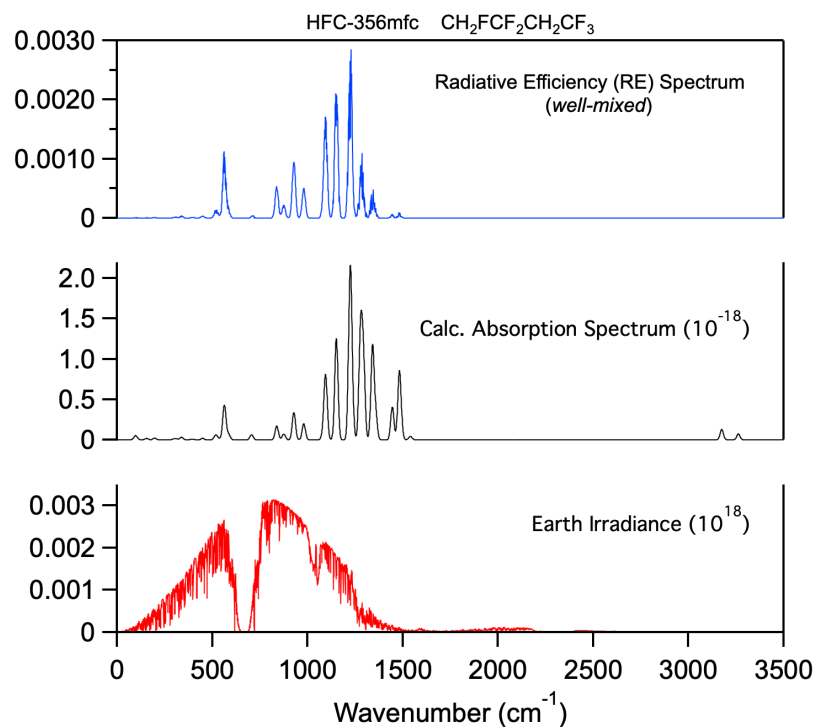
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
29	0.3
95	5.1
103	2.2
155	2.2
197	2.7
297	1.1
310	1.5
338	4
395	1.1
449	2.3
518	7.8
535	1.8
563	54.7
585	9
706	8
838	22.1
875	9.2
928	43.2
980	25.5
1084	13.7
1095	97.7
1151	161.5
1223	233.3
1232	71.1
1278	168.6
1293	127.3
1341	147.1
1358	36.2
1445	52.1
1482	106.1
1493	9.4
1540	5.7
3174	15.4
3179	1.3
3257	0.7
3262	8.8

Radiative Efficiency Spectrum



HFC-356pec

Molecular Formula: CH₂F-CF₂-CHF-CHF₂
 CAS RN: 114810-03-6
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 2.83
 Tropospheric Atmospheric Lifetime (years): 2.93
 Stratospheric Atmospheric Lifetime (years): 81

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.236	0.228
Global Warming Potential (GWP _H):		
GWP ₂₀		878
GWP ₁₀₀		239
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		364
GTP ₅₀		44
GTP ₁₀₀		33

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.78 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.28 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 2.84 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 2.93 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 89.0 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

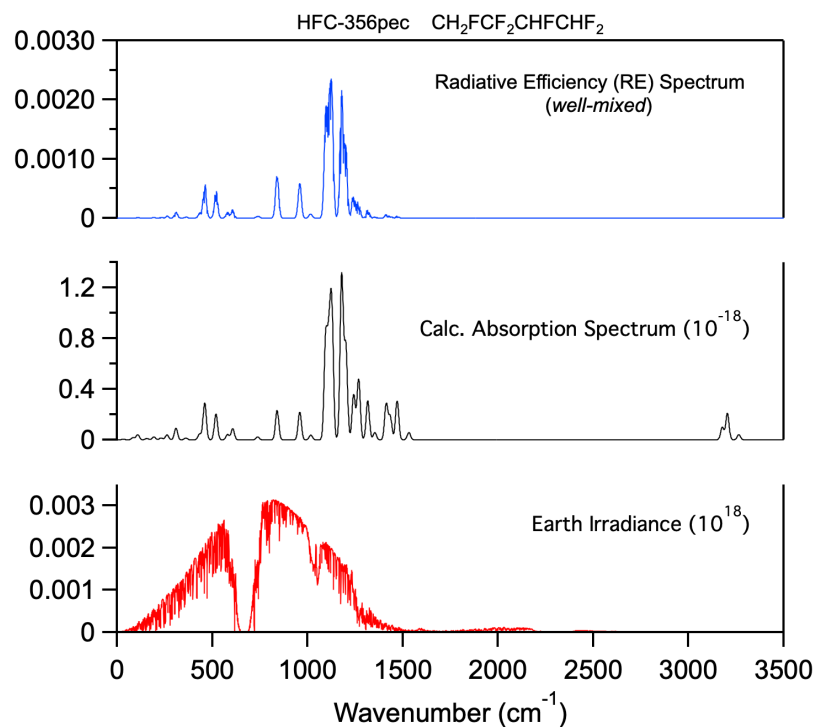
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
33	0.6
84	2.1
108	5.2
156	1.4
193	2.9
231	1.9
262	5
309	11.5
361	1.8
433	5.9
460	37.3
519	26.2
580	5.4
607	11.4
738	2.9
840	29.8
959	27.8
1017	4.8
1095	98.2
1112	87.1
1127	128.4
1179	166
1201	93.1
1242	45.3
1268	60.9
1316	39.7
1353	7.3
1413	36.1
1434	23.2
1470	26.8
1471	12.4
1532	7.5
3177	12.9
3203	17.2
3206	10.1
3264	5.3

Radiative Efficiency Spectrum



HFC-356mef

Molecular Formula: CHF₂-CH₂-CHF-CF₃
 CAS RN: 158421-88-6
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 2.71
 Tropospheric Atmospheric Lifetime (years): 2.81
 Stratospheric Atmospheric Lifetime (years): 78

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.271	0.260
Global Warming Potential (GWP _H):		
GWP ₂₀		961
GWP ₁₀₀		262
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		391
GTP ₅₀		47
GTP ₁₀₀		36

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.85 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.33 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 2.72 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 2.81 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 85.5 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

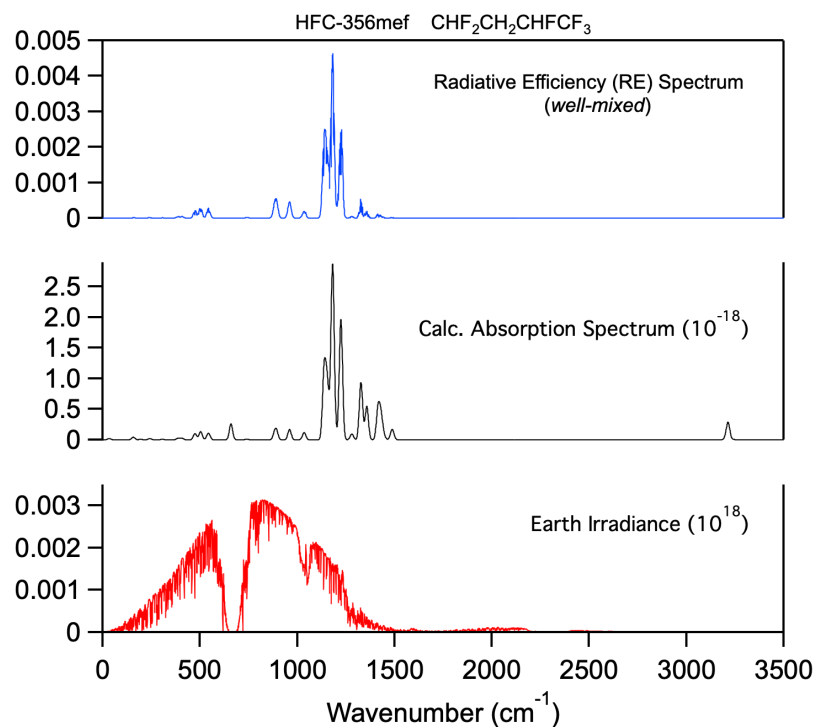
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
33	2.8
68	0.4
92	0.2
157	5.4
194	1.1
242	2.8
306	1.1
387	3.3
408	3
474	13.1
503	16.9
543	14.3
575	0.2
659	33
740	1.4
883	11.9
893	17
960	21.9
1035	15.4
1138	146.2
1154	112.9
1180	142.9
1182	227.3
1224	252.8
1280	12.2
1327	120.4
1357	70
1415	66.1
1430	49.4
1445	7.8
1485	15.2
1492	8.1
3162	0.4
3202	4.2
3214	35.7
3238	1.1

Radiative Efficiency Spectrum



HFC-356mfe

Molecular Formula: CHF₂-CHF-CH₂-CF₃
 CAS RN: 76523-98-3
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 3.05
 Tropospheric Atmospheric Lifetime (years): 3.17
 Stratospheric Atmospheric Lifetime (years): 86

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.270	0.263
Global Warming Potential (GWP _H):		
GWP ₂₀		1093
GWP ₁₀₀		298
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		468
GTP ₅₀		55
GTP ₁₀₀		41

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.65 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.18 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 3.06 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 3.17 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 95.2 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

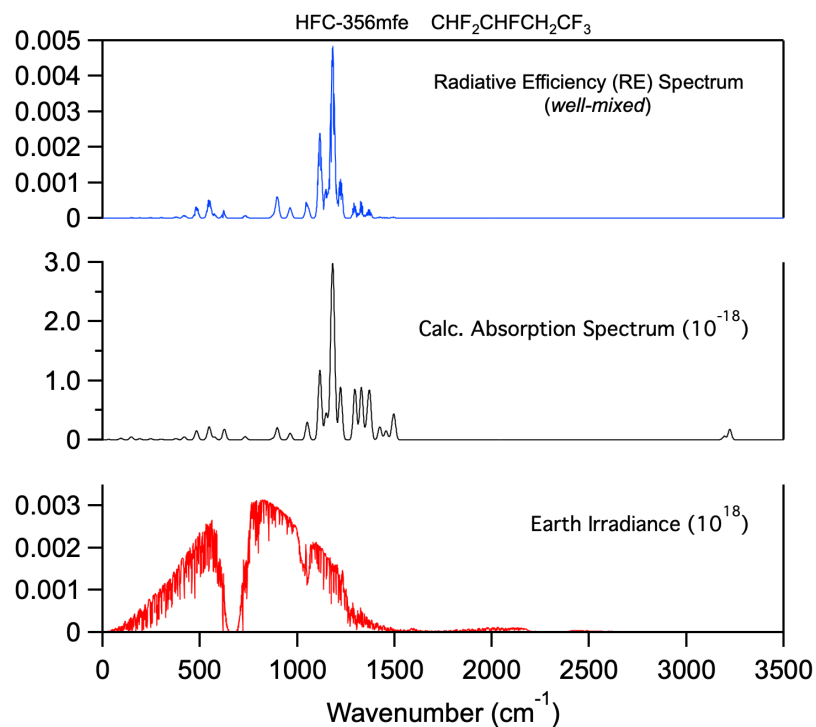
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
30	0.8
77	0.2
94	3.1
147	6.2
190	2.2
247	2.2
301	1.4
376	2.5
419	6.2
482	19.8
533	1.1
547	28
574	6.2
625	23
732	6.7
875	3
897	26.3
963	14.1
1051	38.1
1116	150.8
1148	57.4
1177	244.3
1187	209.5
1222	114.3
1296	110.2
1329	113.4
1359	36.7
1372	94.7
1424	28.1
1456	19.3
1487	12.9
1497	49.7
3175	0.4
3195	7.7
3223	22.6
3255	0.1

Radiative Efficiency Spectrum



HFC-356pcf

Molecular Formula: CHF₂-CH₂-CF₂-CHF₂
 CAS RN: 119450-69-0
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 5.43
 Tropospheric Atmospheric Lifetime (years): 5.66
 Stratospheric Atmospheric Lifetime (years): 137

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.265	0.270
Global Warming Potential (GWP _H):		
GWP ₂₀		1946
GWP ₁₀₀		543
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		1111
GTP ₅₀		119
GTP ₁₀₀		76

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 9.53 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 6.61 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 5.47 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 5.66 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 160.8 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

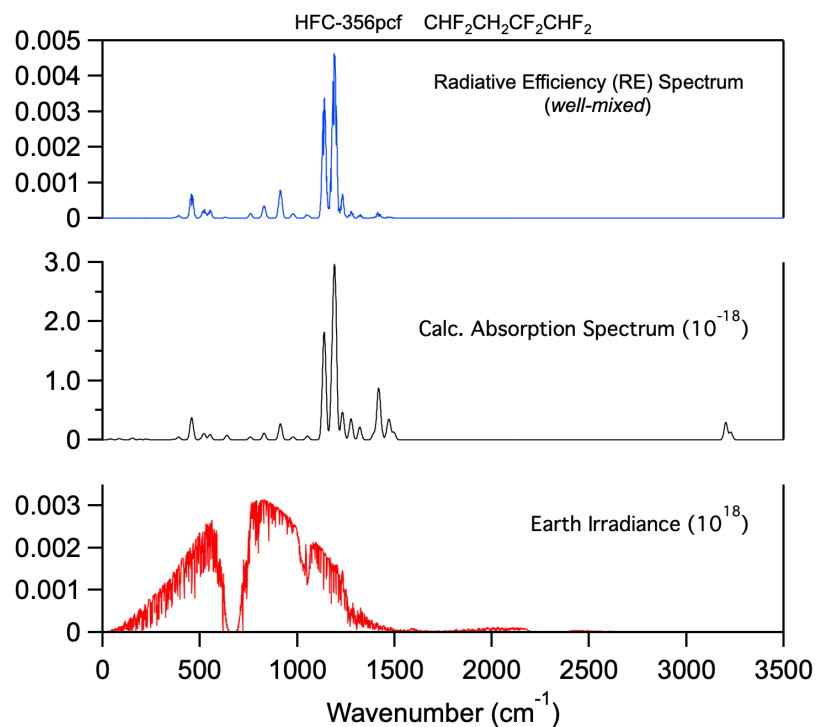
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
39	1.9
83	2.5
101	0.5
152	3.7
190	1.3
224	1.8
306	0.2
364	0.9
390	6.1
457	48.4
511	2.7
521	12.2
551	11.4
638	10.3
758	6.3
829	14.2
913	34.8
978	6.4
1052	8.4
1135	124.9
1141	124.5
1181	164.6
1194	318
1232	59.6
1276	45.6
1321	27.8
1393	13.6
1417	103.9
1429	22.3
1465	22.4
1474	29
1497	15.7
3170	0.1
3202	37.7
3228	16.6
3245	0.1

Radiative Efficiency Spectrum



HFC-356pee

Molecular Formula: CHF₂-CHF-CHF-CHF₂
 CAS RN: 392-45-0
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 3.17
 Tropospheric Atmospheric Lifetime (years): 3.29
 Stratospheric Atmospheric Lifetime (years): 89

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.256	0.251
Global Warming Potential (GWP _H):		
GWP ₂₀		1081
GWP ₁₀₀		295
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		470
GTP ₅₀		55
GTP ₁₀₀		41

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.59 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.14 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 3.18 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 3.29 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 98.6 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

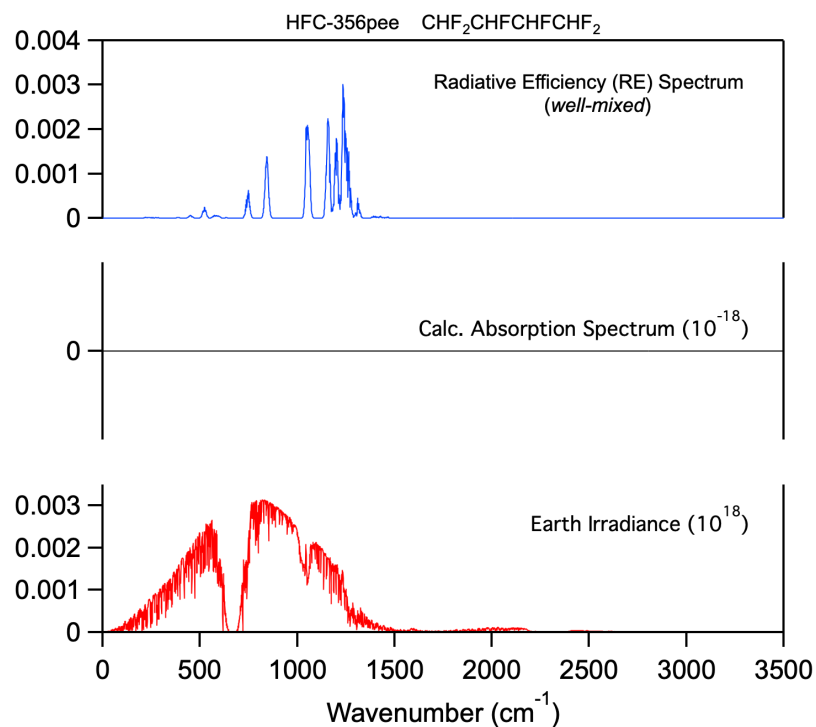
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
42	1.9
76	1.6
80	1.3
159	5.8
176	0.2
223	1.8
250	8.1
263	0
405	15.4
443	0
477	57.5
567	0
609	21.3
753	1.5
772	29.9
882	14.6
1025	12.3
1026	0.8
1105	11.7
1114	297.1
1130	86
1188	189.9
1195	119.4
1211	8.6
1334	0.6
1343	4.3
1369	56.3
1407	19.6
1423	10.1
1441	40.2
1466	11
1482	2.2
3180	0.6
3181	11.3
3220	1.2
3220	43.7

Radiative Efficiency Spectrum



HFC-356mff

Molecular Formula: CF₃-CH₂-CH₂-CF₃
 CAS RN: 407-59-0
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 9.39 (8.5)
 Tropospheric Atmospheric Lifetime (years): 9.84 (8.9)
 Stratospheric Atmospheric Lifetime (years): 205.8 (190)

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.287	0.300
Global Warming Potential (GWP _H):		
GWP ₂₀		3383
GWP ₁₀₀		1045
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2474
GTP ₅₀		371
GTP ₁₀₀		149

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{SAR}}(298 \text{ K}) = 5.65 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.80 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 9.49 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 9.84 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 264.7 \text{ years}$$

$$k_{\text{Rec}}(T) = 3.4 \times 10^{-12} \exp(-1820/T)$$

$$k_{\text{Rec}}(298 \text{ K}) = 7.6 \times 10^{-15}$$

$$k_{\text{Rec}}(272 \text{ K}) = 4.22 \times 10^{-15}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

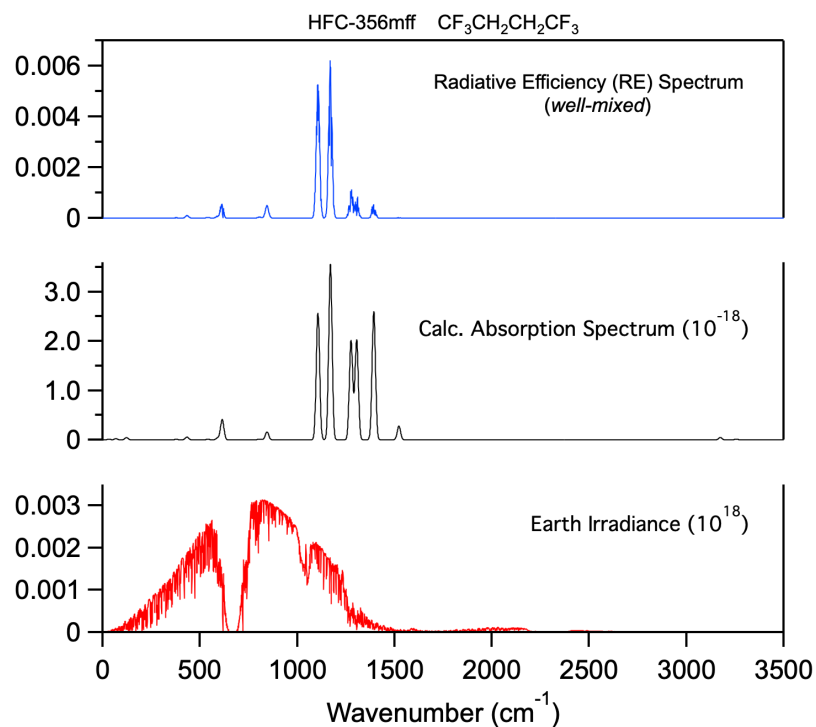
$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

$$k_{\text{Rec}}(T) = NA$$

Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
32	1.6
67	2.7
122	5.5
131	0
198	0
315	0
348	0
378	1.3
433	7
532	0
533	0
540	1.4
591	4.9
614	53
687	0
805	1.8
844	20.8
876	0
992	0
1106	329.8
1108	0
1170	456.9
1207	0
1221	0
1276	258.6
1305	260.3
1325	0
1377	0
1393	335.1
1492	0
1514	0
1522	35.2
3168	0
3174	5.9
3239	0
3256	1.9

Radiative Efficiency Spectrum



HFC-356qcc

Molecular Formula: CH₂F-CF₂-CF₂-CH₂F
 CAS RN: 114810-02-5
 Molecular Weight: 166.06

Global Atmospheric Lifetime (years): 7.03
 Tropospheric Atmospheric Lifetime (years): 7.34
 Stratospheric Atmospheric Lifetime (years): 166

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.231	0.239
Global Warming Potential (GWP _H):		
GWP ₂₀		2154
GWP ₁₀₀		622
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		1395
GTP ₅₀		163
GTP ₁₀₀		87

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 7.45 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 5.10 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 7.09 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 7.34 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 203.3 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 4.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 925 \text{ years}$$

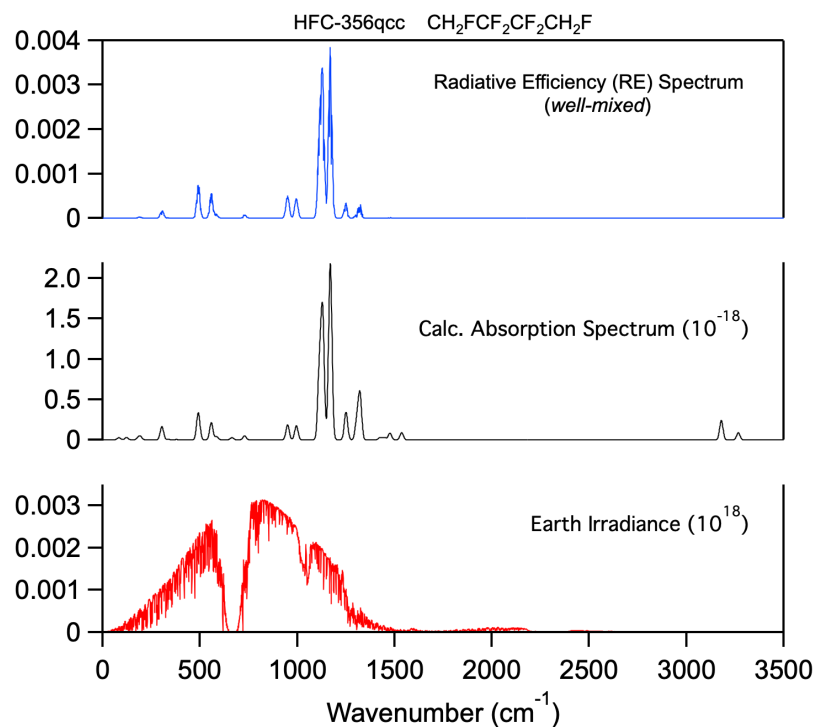
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
40	0
83	3.5
122	3.8
183	3.5
194	4.4
235	0.4
304	21.3
337	0.7
356	0
379	0.5
432	0.3
491	43.4
558	27.3
585	4.9
664	3.5
729	6.3
950	23.6
995	22.5
1113	50
1114	61.4
1130	198.3
1169	269.4
1177	16.6
1250	42.4
1253	1.7
1306	31.8
1322	71.9
1426	3.8
1448	3.7
1476	10.7
1536	9.4
1538	2.1
3178	15.5
3180	15.5
3266	5.7
3267	5.7

Radiative Efficiency Spectrum



HFC-365mcf

Molecular Formula: CH₃-CH₂-CF₂-CF₃
 CAS RN: 37826-35-0
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 1.64
 Tropospheric Atmospheric Lifetime (years): 1.69
 Stratospheric Atmospheric Lifetime (years): 50

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.215	0.193
Global Warming Potential (GWP _H):		
GWP ₂₀		483
GWP ₁₀₀		131
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		169
GTP ₅₀		23
GTP ₁₀₀		18

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 3.00 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 2.21 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.64 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.69 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 54.1 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

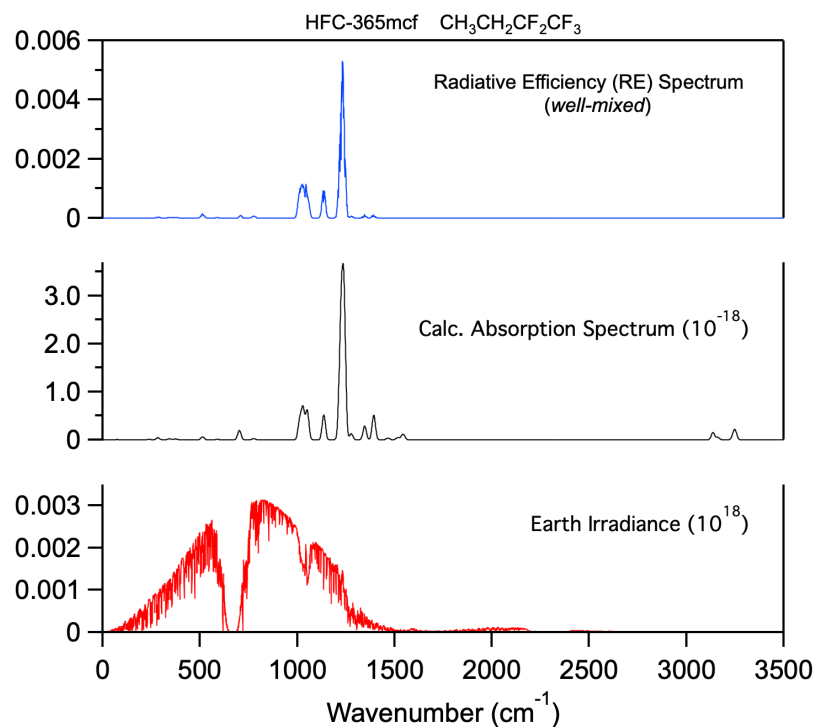
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
73	0.8
86	0
163	0.5
204	0.6
237	1.3
283	5.5
341	2.4
353	0.5
375	2.4
448	0.3
513	7.9
589	0.9
590	0.5
702	25.1
776	3
816	0
1012	50.2
1029	81
1051	77.2
1136	66.7
1219	101.4
1227	248.6
1240	350
1277	16.1
1346	36.4
1393	66.3
1442	0
1466	4.8
1514	5.3
1535	5.3
1546	12.1
3136	19.7
3161	6.7
3228	0.4
3243	15.7
3252	16.4

Radiative Efficiency Spectrum



HFC-365mee

Molecular Formula: CH₃-CHF-CHF-CF₃
 CAS RN: 161791-22-6
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 1.09
 Tropospheric Atmospheric Lifetime (years): 1.12
 Stratospheric Atmospheric Lifetime (years): 36

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.209	0.174
Global Warming Potential (GWP _H):		
GWP ₂₀		289
GWP ₁₀₀		79
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		94
GTP ₅₀		13
GTP ₁₀₀		11

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 4.44 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.33 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.09 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.12 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 37.4 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{^1D})} = 740 \text{ years}$$

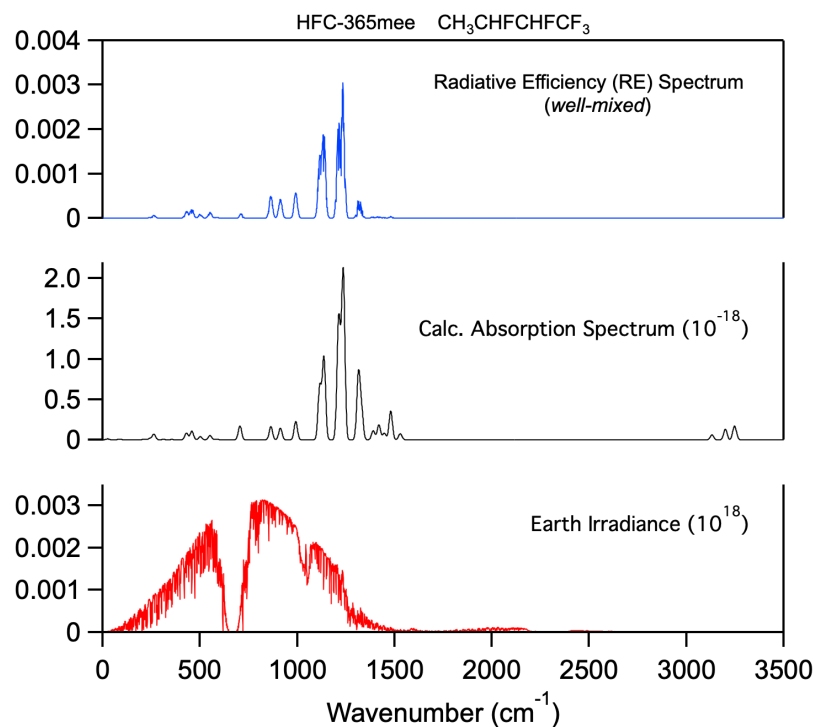
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
25	1.4
86	1.3
158	0.2
213	1.2
243	2.2
263	8.7
312	0.7
355	0.6
430	10.8
458	13.7
501	4.9
551	6.7
587	0.9
705	22.2
864	20.7
913	18.7
992	29.1
1115	83.7
1136	37.9
1137	92.3
1208	39.5
1214	160.5
1236	267.7
1314	102.5
1330	45.3
1390	14.4
1419	23.9
1447	10.7
1480	46
1527	5.7
1532	4.3
3131	8.1
3188	0.5
3200	16.9
3245	17.6
3254	6.6

Radiative Efficiency Spectrum



HFC-365pce

Molecular Formula: CH₃-CHF-CF₂-CHF₂
 CAS RN: 158421-89-7
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 4.35
 Tropospheric Atmospheric Lifetime (years): 4.52
 Stratospheric Atmospheric Lifetime (years): 112

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.202	0.203
Global Warming Potential (GWP _H):		
GWP ₂₀		1333
GWP ₁₀₀		366
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		677
GTP ₅₀		73
GTP ₁₀₀		51

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.18 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 8.27 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 4.37 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 4.52 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 131.4 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

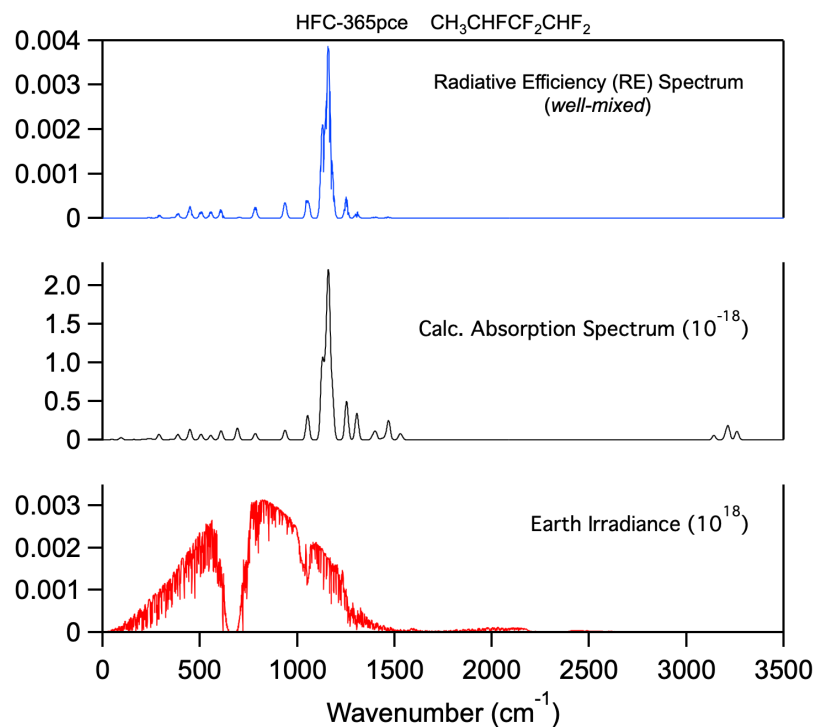
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
47	0.7
94	3.5
160	0.5
208	1
231	1.5
251	1.3
289	9
354	0.9
386	8.9
448	17.3
505	9
555	7.2
608	15.1
692	19.1
784	10.5
937	16
1053	40.6
1128	125.2
1145	63.4
1151	50.8
1161	237.2
1180	71.4
1253	63.9
1306	43.6
1389	6
1402	12.5
1435	2.1
1453	4
1469	31.4
1526	6.5
1535	5.2
3141	7.4
3202	8.9
3215	20.4
3255	7.7
3263	8.1

Radiative Efficiency Spectrum



HFC-365pec

Molecular Formula: CH₃-CF₂-CHF-CHF₂
 CAS RN: 119450-71-4
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 5.44
 Tropospheric Atmospheric Lifetime (years): 5.67
 Stratospheric Atmospheric Lifetime (years): 132

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.207	0.211
Global Warming Potential (GWP _H):		
GWP ₂₀		1710
GWP ₁₀₀		477
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		976
GTP ₅₀		104
GTP ₁₀₀		67

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 9.51 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 6.60 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 5.48 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 5.67 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 161.1 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

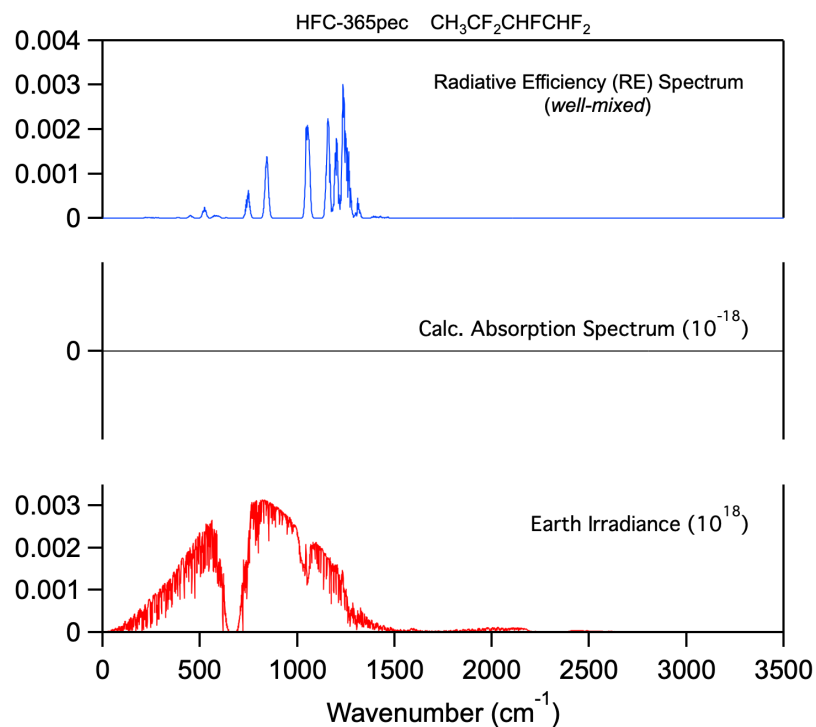
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
46	0.2
90	3.1
160	0.3
214	0.7
235	2.2
256	5.9
283	1.9
347	0.3
414	0.4
465	12.3
487	42
551	2.5
611	12.4
727	4.3
843	37.6
953	11.8
980	35.5
1041	17.9
1114	90.5
1122	146.2
1200	73
1208	138.3
1248	90.9
1306	77.2
1350	9.9
1412	22.9
1439	8
1462	59.5
1467	45.9
1520	4.7
1524	0.7
3138	3
3185	9.9
3202	25.8
3255	7
3261	3.6

Radiative Efficiency Spectrum



HFC-365qcc

Molecular Formula: CH₃-CF₂-CF₂-CH₂F
 CAS RN: 119450-72-5
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 10.1
 Tropospheric Atmospheric Lifetime (years): 10.6
 Stratospheric Atmospheric Lifetime (years): 205

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.212	0.222
Global Warming Potential (GWP _H):		
GWP ₂₀		2952
GWP ₁₀₀		932
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2216
GTP ₅₀		360
GTP ₁₀₀		134

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 5.26 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.53 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 10.2 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 10.6 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 283.4 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

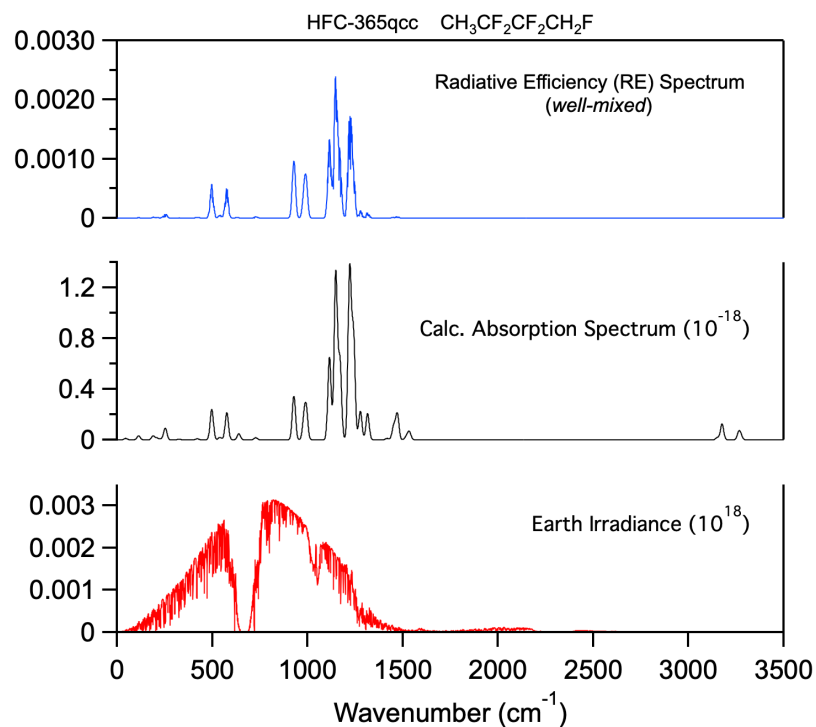
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
45	1.4
113	4.1
189	3.8
209	1.8
233	0.9
253	11.7
325	0.6
354	0.1
365	0.1
421	1
497	31
540	2.5
576	27.6
639	6.2
728	2.1
928	44
981	18.5
993	29.2
1115	83.9
1148	169
1170	78.6
1221	171.3
1241	104.9
1277	28.9
1315	26.6
1418	1.4
1452	13.9
1471	26.2
1518	2.7
1530	4.4
1537	4.6
3151	2.3
3176	16.1
3263	5.7
3270	3.3
3276	2.1

Radiative Efficiency Spectrum



HFC-365mfc

Molecular Formula: CH₃-CF₂-CH₂-CF₃
 CAS RN: 406-58-6
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 10.9
 Tropospheric Atmospheric Lifetime (years): 11.4
 Stratospheric Atmospheric Lifetime (years): 215

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.204	0.215
Global Warming Potential (GWP _H):		
GWP ₂₀		3005
GWP ₁₀₀		972
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2315
GTP ₅₀		410
GTP ₁₀₀		141

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{SAR}}(298 \text{ K}) = 4.90 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.27 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 11.0 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 11.4 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 303.4 \text{ years}$$

$$k_{\text{Rec}}(T) = 1.8 \times 10^{-12} \exp(-1660/T)$$

$$k_{\text{Rec}}(T) = 6.9 \times 10^{-15}$$

$$k_{\text{Rec}}(T) = 4.02 \times 10^{-15}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

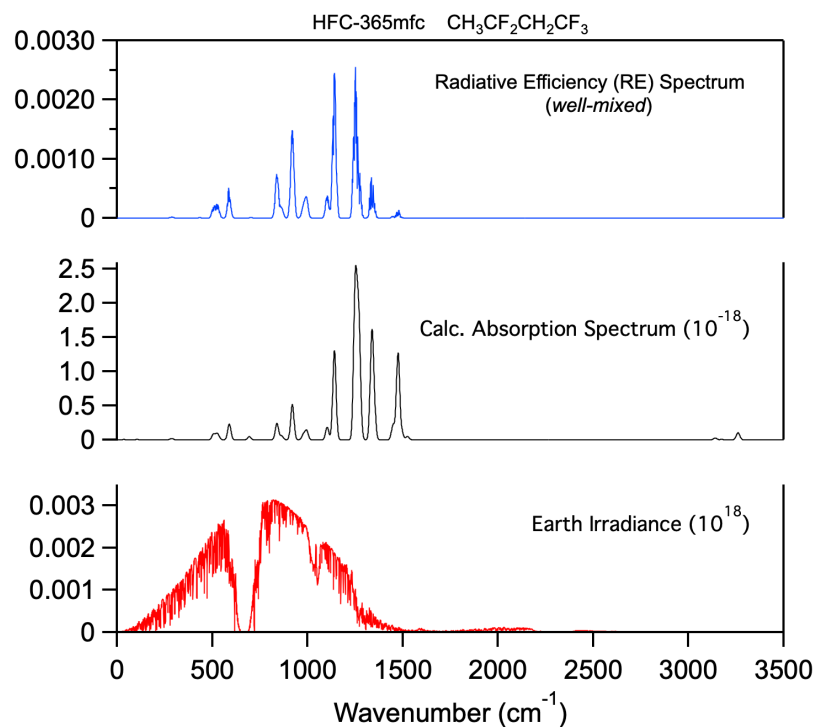
$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

$$k_{\text{Rec}}(T) = NA$$

Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
35	0.6
105	0.7
154	0.5
230	0
286	2.5
301	0.1
316	0
384	0.4
432	0.5
506	10.6
525	11
536	2.2
589	29.7
694	6.1
839	30.7
864	7.3
920	66.2
978	9.9
995	17
1103	23.4
1141	167.9
1250	281.4
1266	196.9
1275	58
1337	184.5
1349	56.5
1449	27.9
1475	162.5
1495	12.8
1523	1.7
1525	4.6
3140	3.5
3174	0.8
3249	0.2
3257	8
3264	6.3

Radiative Efficiency Spectrum



HFC-365mef

Molecular Formula: CH₂F-CH₂-CHF-CF₃
 CAS RN: 161791-23-7
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 1.07
 Tropospheric Atmospheric Lifetime (years): 1.10
 Stratospheric Atmospheric Lifetime (years): 35

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.218	0.180
Global Warming Potential (GWP _H):		
GWP ₂₀		294
GWP ₁₀₀		80
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		96
GTP ₅₀		14
GTP ₁₀₀		11

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 4.52 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.40 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.07 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.10 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 36.8 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

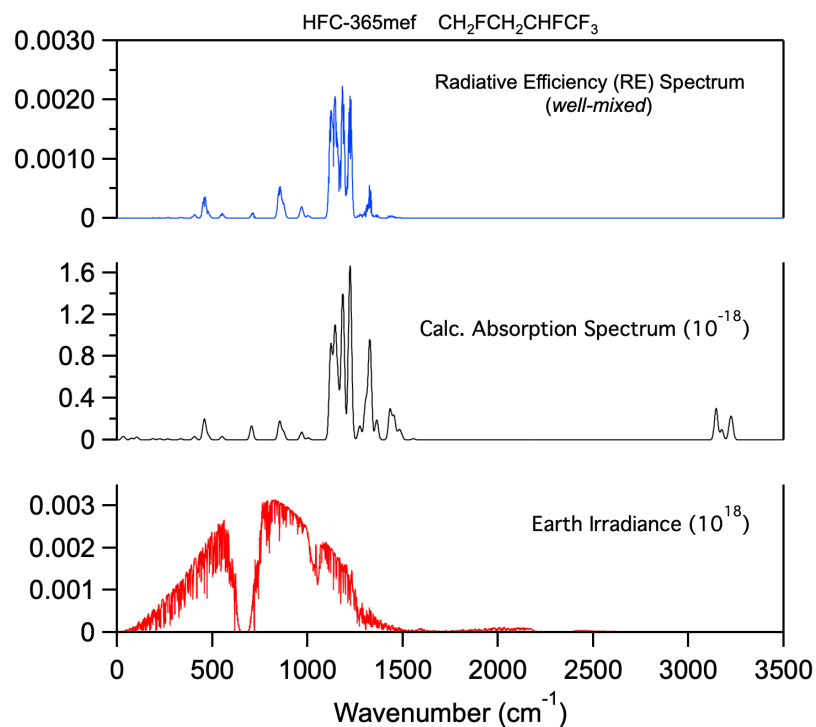
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
33	4.4
77	1.9
104	3.3
189	1.3
224	1.2
267	1.1
334	1.2
406	4.1
458	25.3
478	5.2
551	4.1
574	0.1
706	16.9
853	22.5
873	9.7
969	9.5
1004	2.4
1122	113.5
1144	128.4
1160	54.3
1185	178.8
1223	214.2
1274	17.1
1305	46.2
1327	121.7
1363	24.5
1433	36.9
1454	28.2
1478	8.9
1490	7.3
1555	1.3
3143	24.6
3148	15.9
3175	12.5
3217	16.1
3228	19.4

Radiative Efficiency Spectrum



HFC-365pcf

Molecular Formula: CH₂F-CH₂-CF₂-CHF₂
 CAS RN: 161791-25-9
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 1.26
 Tropospheric Atmospheric Lifetime (years): 1.30
 Stratospheric Atmospheric Lifetime (years): 40

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.211	0.180
Global Warming Potential (GWP _H):		
GWP ₂₀		347
GWP ₁₀₀		94
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		116
GTP ₅₀		16
GTP ₁₀₀		13

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 3.87 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 2.88 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.26 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.30 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 42.7 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

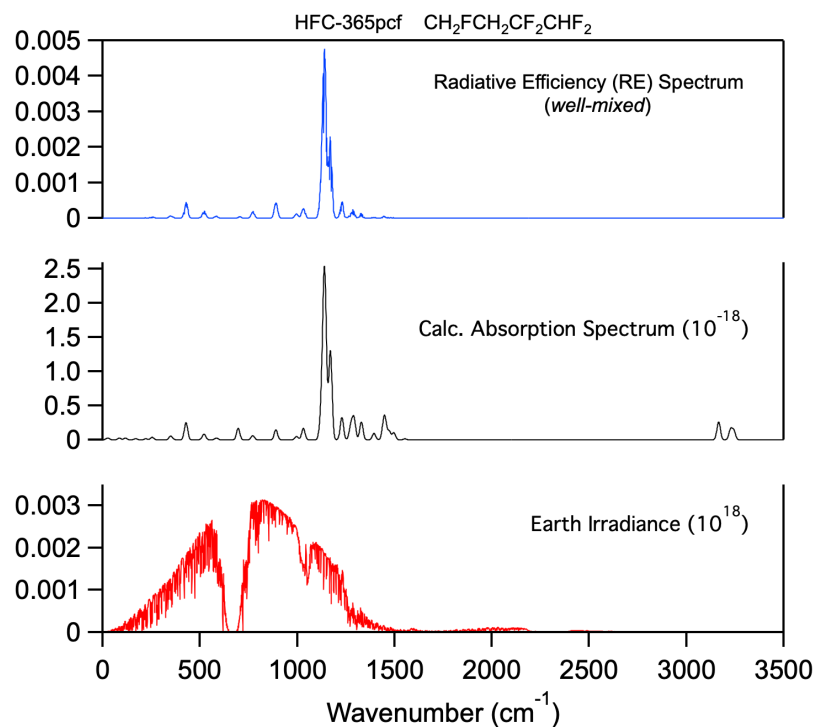
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
26	3.5
85	3.1
116	3.3
169	2
221	1.8
254	4.8
349	6.9
363	0.6
428	32.5
509	1.1
521	10.4
584	3.4
696	21.3
771	7.8
890	18.9
996	6.2
1031	21.9
1121	35.5
1135	167
1143	193
1170	166.1
1229	41.9
1275	26.5
1291	40
1329	33.5
1394	12
1443	22
1451	29.8
1472	15.9
1496	13.2
1553	1.8
3158	2.9
3166	31.7
3226	17.3
3233	3.3
3244	15.8

Radiative Efficiency Spectrum



HFC-365mfe

Molecular Formula: CH₂F-CHF-CH₂-CF₃
 CAS RN: 161791-24-8
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 0.84
 Tropospheric Atmospheric Lifetime (years): 0.87
 Stratospheric Atmospheric Lifetime (years): 28

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.213	0.167
Global Warming Potential (GWP _H):		
GWP ₂₀		214
GWP ₁₀₀		58
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		68
GTP ₅₀		10
GTP ₁₀₀		8

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 5.69 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 4.32 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.84 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.87 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 29.6 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

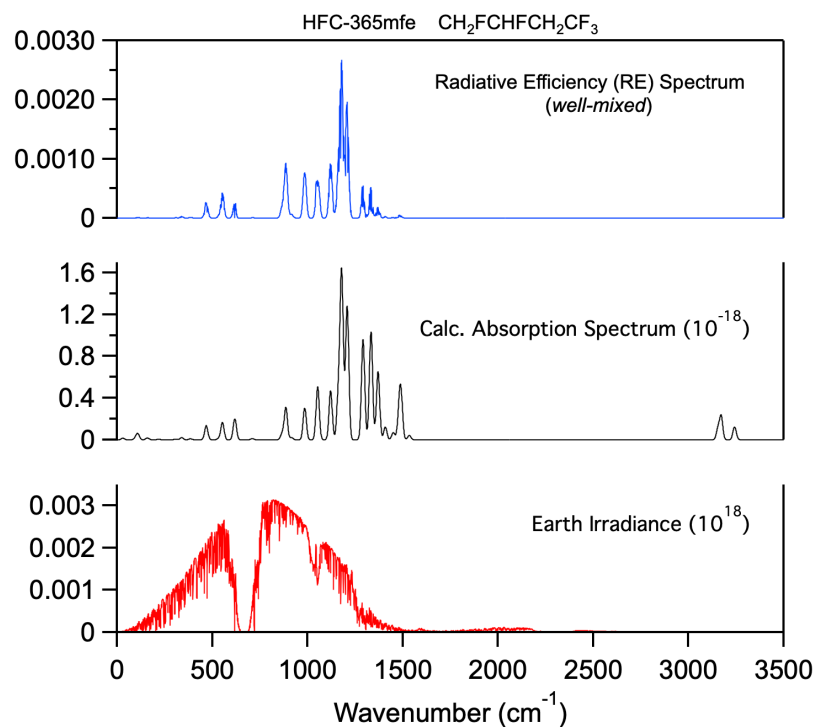
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
30	2
97	2.3
109	7
159	2.4
218	0.8
307	0.8
339	2.6
385	1.2
468	17.3
533	1.4
553	21.5
618	25.5
710	1.4
866	7.3
886	39.7
916	2.7
985	38.9
1053	64.8
1121	60.3
1162	55.7
1179	203
1208	164
1290	42.9
1292	81
1333	132.9
1370	83.8
1408	15.5
1450	9
1481	33.4
1491	47.5
1534	5.5
3154	12.7
3170	12
3172	17.2
3241	14.9
3251	1.5

Radiative Efficiency Spectrum



HFC-365qee

Molecular Formula: CH₂F-CHF-CHF-CHF₂
 CAS RN: 157016-17-6
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 1.96
 Tropospheric Atmospheric Lifetime (years): 2.03
 Stratospheric Atmospheric Lifetime (years): 59

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.193	0.178
Global Warming Potential (GWP _H):		
GWP ₂₀		535
GWP ₁₀₀		146
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		196
GTP ₅₀		26
GTP ₁₀₀		20

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 2.52 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.84 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.97 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 2.03 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 63.9 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

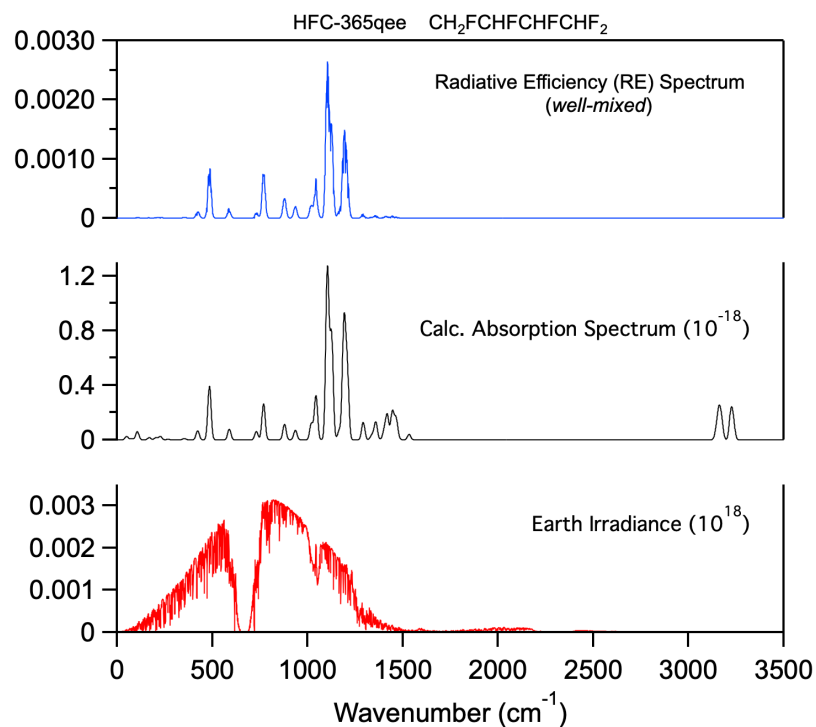
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
50	3.1
78	1
106	7.7
169	2
204	2
227	3.1
267	0.5
353	1.2
423	8.4
485	50.3
589	9.9
731	7.8
769	33.8
879	14.4
936	9
1020	15.1
1044	41.1
1104	159.8
1126	96.8
1166	8.5
1191	108.8
1208	66.2
1292	16.4
1338	4.5
1358	16.6
1402	8
1418	23
1445	26
1464	19.2
1476	1.8
1533	5.1
3146	8.9
3160	25.7
3174	16.5
3222	24
3235	16.7

Radiative Efficiency Spectrum



HFC-365pfc

Molecular Formula: CH₂F-CF₂-CH₂-CHF₂
 CAS RN: 119450-76-9
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 3.28
 Tropospheric Atmospheric Lifetime (years): 3.40
 Stratospheric Atmospheric Lifetime (years): 89

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.212	0.208
Global Warming Potential (GWP _H):		
GWP ₂₀		1041
GWP ₁₀₀		284
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		460
GTP ₅₀		53
GTP ₁₀₀		39

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.54 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.10 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 3.29 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 3.40 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 101.6 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

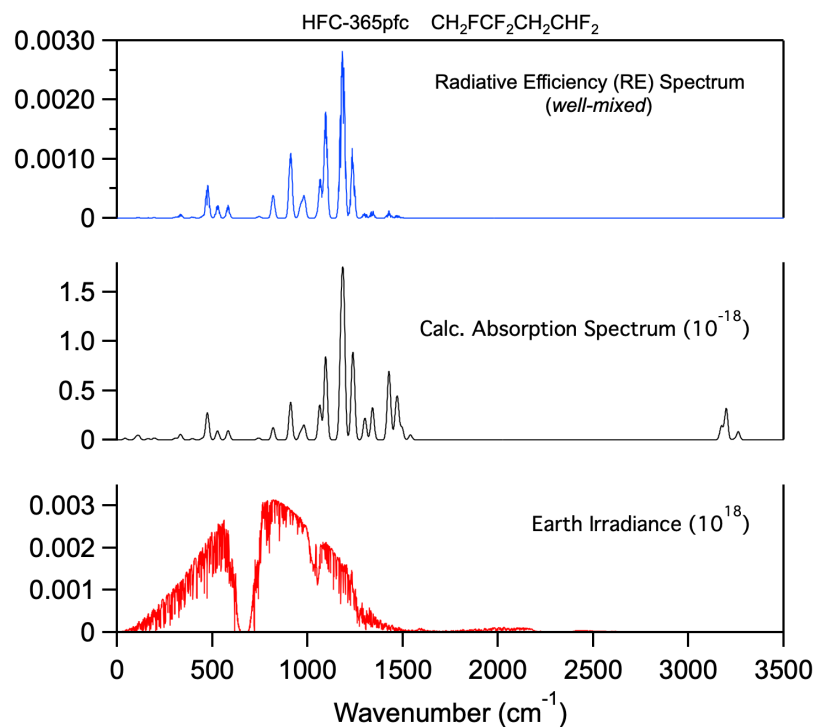
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
42	2
99	3.1
113	5.1
163	1.7
196	2.4
306	2.2
333	7.1
396	1.5
449	2
474	35.3
527	11.8
583	12
743	2.5
819	15.7
911	48.6
964	9.9
982	17.9
1064	45.3
1095	108.3
1176	125.8
1189	171.1
1234	51.4
1241	72.6
1301	28.3
1341	41.9
1425	62.2
1432	34.1
1461	17.5
1472	48.2
1495	15.7
1540	6.4
3166	0.9
3173	17.2
3198	41
3240	1.1
3261	10.6

Radiative Efficiency Spectrum



HFC-365qce

Molecular Formula: CH₂F-CF₂-CHF-CH₂F
 CAS RN: 119450-75-8
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 2.07
 Tropospheric Atmospheric Lifetime (years): 2.15
 Stratospheric Atmospheric Lifetime (years): 62

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.178	0.166
Global Warming Potential (GWP _H):		
GWP ₂₀		526
GWP ₁₀₀		143
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		196
GTP ₅₀		25
GTP ₁₀₀		20

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 2.39 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.74 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 2.08 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 2.15 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 67.1 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

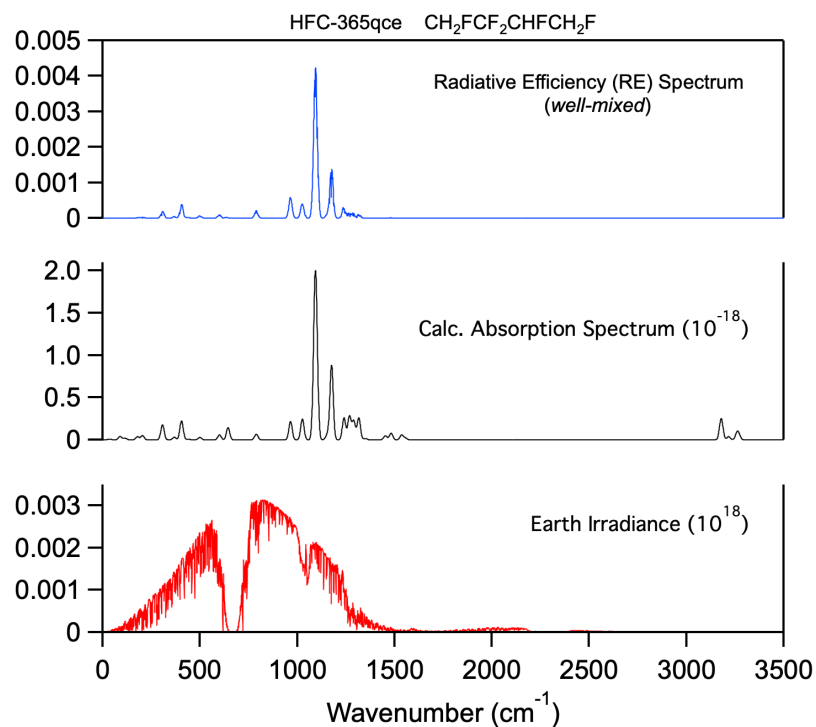
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
35	1.1
89	4.9
113	2.8
179	4.7
204	6.3
257	0.4
307	22.7
368	3.9
405	28.6
440	0.9
499	3.8
600	7.5
644	18.6
789	8.7
965	28
1026	31.5
1089	120.8
1093	53.9
1098	112.6
1154	7.7
1176	112.8
1240	33.3
1268	35.7
1290	28.6
1316	32.9
1350	2
1448	1.7
1454	4.7
1482	10.3
1536	7.3
1554	2.8
3176	19.6
3182	14.7
3216	4.8
3260	10
3270	5.7

Radiative Efficiency Spectrum



HFC-365mff

Molecular Formula: CHF₂-CH₂-CH₂-CF₃
 CAS RN: 161879-85-2
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 3.32
 Tropospheric Atmospheric Lifetime (years): 3.44
 Stratospheric Atmospheric Lifetime (years): 90

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.254	0.250
Global Warming Potential (GWP _H):		
GWP ₂₀		1263
GWP ₁₀₀		344
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		561
GTP ₅₀		64
GTP ₁₀₀		48

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.52 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.09 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 3.33 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 3.44 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 102.8 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

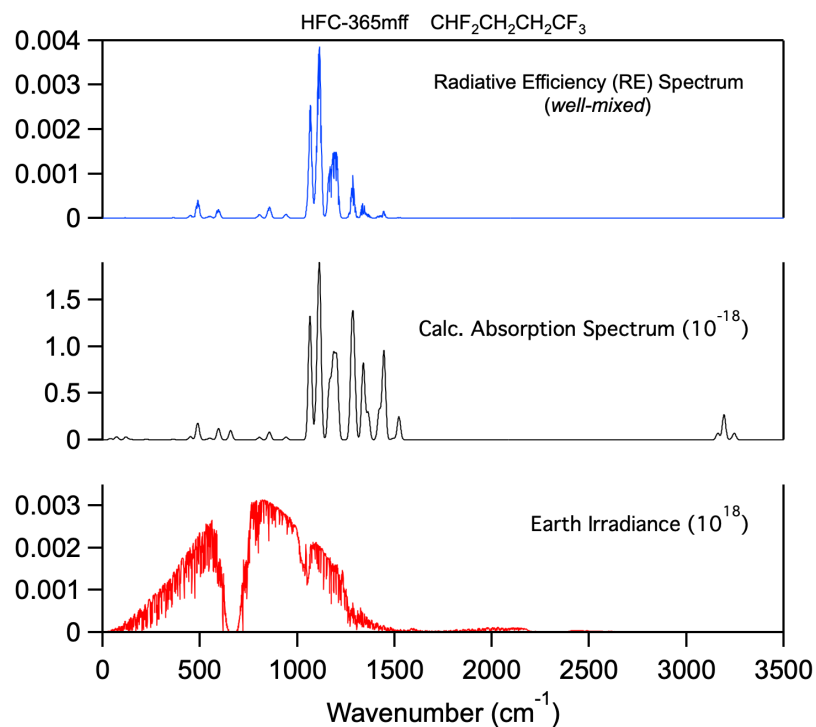
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
40	1.7
71	4.2
119	4
142	0.9
224	1.1
322	0.2
362	0.9
451	4.3
488	23
535	0.5
551	2.2
595	15.7
657	12.6
805	3.5
856	10.8
942	3.9
1065	169.6
1101	60.3
1114	223
1165	74.8
1185	103.9
1203	104.1
1280	118
1291	101.2
1339	105.5
1364	36.8
1421	39.8
1445	122
1492	1.9
1512	0.1
1522	31.6
3156	1
3162	8.4
3193	34.5
3229	0.9
3246	9.1

Radiative Efficiency Spectrum



HFC-365pef

Molecular Formula: CHF₂-CH₂-CHF-CHF₂
 CAS RN: 119450-77-0
 Molecular Weight: 148.07

Global Atmospheric Lifetime (years): 2.14
 Tropospheric Atmospheric Lifetime (years): 2.22
 Stratospheric Atmospheric Lifetime (years): 63

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.229	0.214
Global Warming Potential (GWP _H):		
GWP ₂₀		699
GWP ₁₀₀		190
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		262
GTP ₅₀		34
GTP ₁₀₀		26

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 2.32 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.69 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 2.15 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 2.22 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 69.1 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 5.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 740 \text{ years}$$

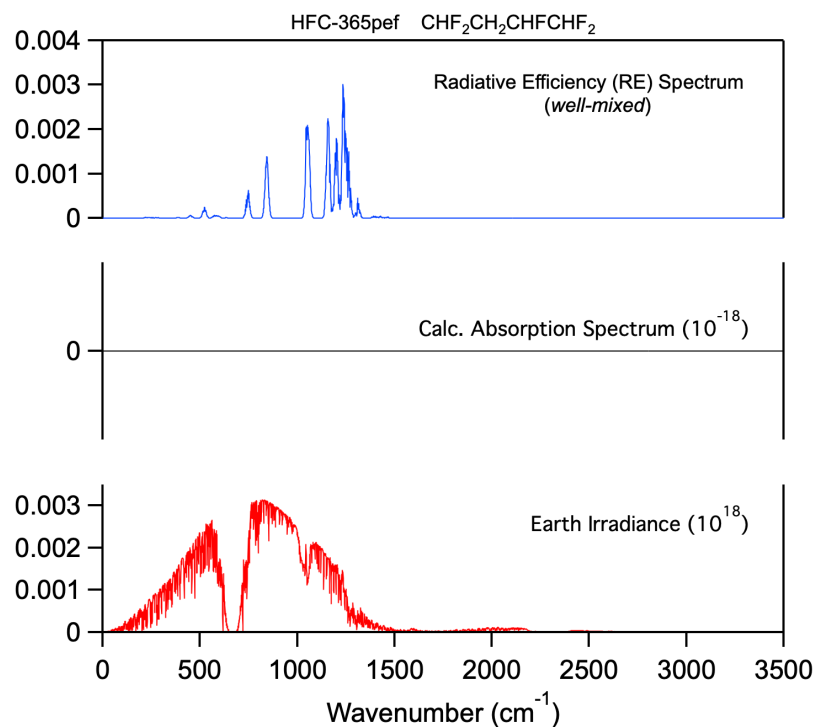
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
35	2.8
81	1.6
98	1.4
167	5.6
195	4.5
248	5.5
342	13
410	3.6
458	19.1
506	7.5
567	4.8
660	28.1
759	2.5
875	10.9
916	16.5
1003	45.5
1027	31.2
1111	85.5
1137	276.3
1145	65.1
1173	144.8
1207	33
1279	6
1341	9.7
1359	37
1416	44.4
1418	16.5
1429	52
1461	2.6
1482	19.8
1485	11.4
3157	0.4
3194	6.4
3206	37.6
3222	25.5
3232	1.6

Radiative Efficiency Spectrum



HFC-374mef

Molecular Formula: $\text{CF}_3\text{-CHF-CH}_2\text{-CH}_3$
 CAS RN: 161791-15-7
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 0.63
 Tropospheric Atmospheric Lifetime (years): 0.65
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.187	0.135
Global Warming Potential (GWP _H):		
GWP ₂₀		148
GWP ₁₀₀		40
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		46
GTP ₅₀		7
GTP ₁₀₀		6

* RE units: $\text{W m}^2 \text{ppb}^{-1}$
 * GWP and GTP: Relative to CO_2

Atmospheric Loss Processes *****

OH Reactivity ($\text{cm}^3 \text{molecule}^{-1} \text{s}^{-1}$)

$$k_{\text{Rec}}(\text{T}) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 7.52 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 5.78 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.65 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.65 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity ($\text{cm}^3 \text{molecule}^{-1} \text{s}^{-1}$)

$$k_{\text{Est}}(\text{T}) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

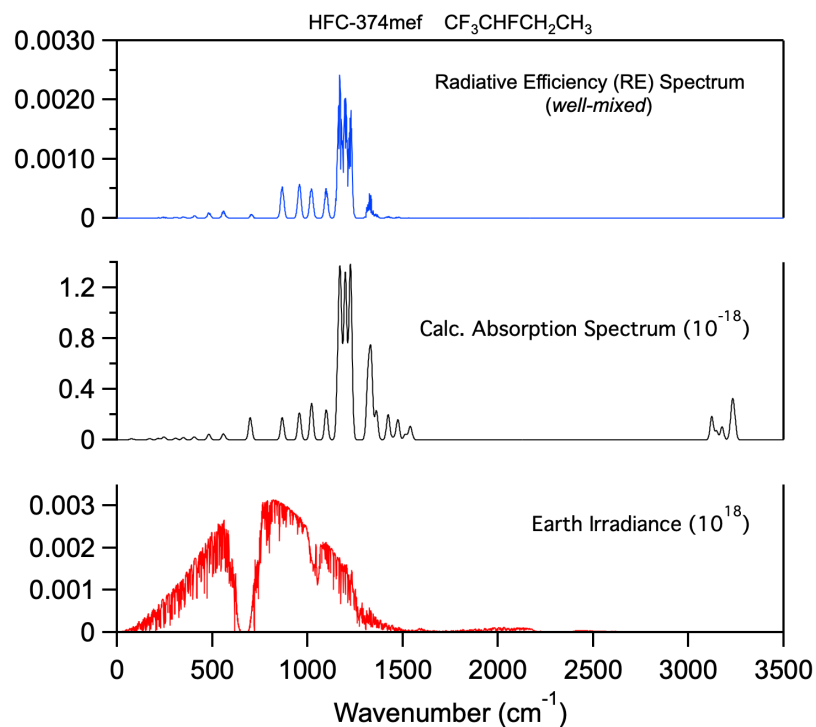
$$k_{\text{Rec}}(\text{T}) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
75	1
91	0.2
171	1.2
216	1.4
246	3
307	1.6
348	2.4
405	3
482	5.6
558	5.9
574	0.5
699	22.6
797	0.2
867	22.5
957	27.2
1021	36.6
1098	30.4
1161	63.7
1172	143.1
1198	167.3
1225	176.9
1317	59
1333	83.1
1361	29.2
1423	25.7
1450	2.4
1474	20.5
1513	5.5
1536	7.8
1543	7.1
3122	23.6
3147	9
3176	13.2
3213	1.4
3229	32.9
3241	19.2

Radiative Efficiency Spectrum



HFC-374mfe

Molecular Formula: $\text{CF}_3\text{-CH}_2\text{-CHF-CH}_3$
 CAS RN: 86884-13-1
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 0.49
 Tropospheric Atmospheric Lifetime (years): 0.50
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.187	0.124
Global Warming Potential (GWP _H):		
GWP ₂₀		106
GWP ₁₀₀		29
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		32
GTP ₅₀		5
GTP ₁₀₀		4

* RE units: $\text{W m}^2 \text{ppb}^{-1}$
 * GWP and GTP: Relative to CO_2

Atmospheric Loss Processes *****

OH Reactivity ($\text{cm}^3 \text{molecule}^{-1} \text{s}^{-1}$)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 9.57 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 7.42 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.49 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.50 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity ($\text{cm}^3 \text{molecule}^{-1} \text{s}^{-1}$)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

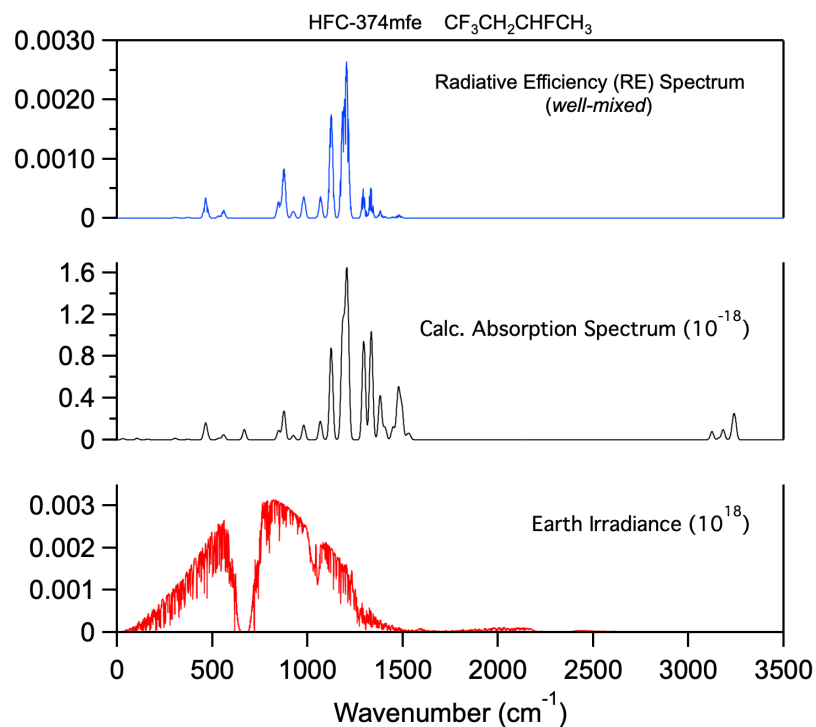
$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

$$k_{\text{Rec}}(T) = NA$$

Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
31	1.5
105	1.8
160	1
239	0
302	1.4
312	0.6
371	1
463	16
471	6.6
533	1.8
559	6.4
668	12.7
848	11.3
876	35.1
925	5.3
980	18.2
1067	22.9
1124	113.6
1184	131.3
1201	96.4
1210	141.4
1295	121.5
1334	132.9
1381	53.9
1406	15.3
1449	15.8
1476	60.5
1494	39.8
1523	5
1535	5.7
3123	10.3
3160	2
3182	12.6
3231	9.3
3238	14.3
3245	15.6

Radiative Efficiency Spectrum



HFC-374mff

Molecular Formula: CF₃-CH₂-CH₂-CH₂F
 CAS RN: 83234-21-3
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 0.21
 Tropospheric Atmospheric Lifetime (years): 0.21
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.173	0.078
Global Warming Potential (GWP _H):		
GWP ₂₀		29
GWP ₁₀₀		8
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		9
GTP ₅₀		1
GTP ₁₀₀		1

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 2.18 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.75 \times 10^{-13}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.21 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.21 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

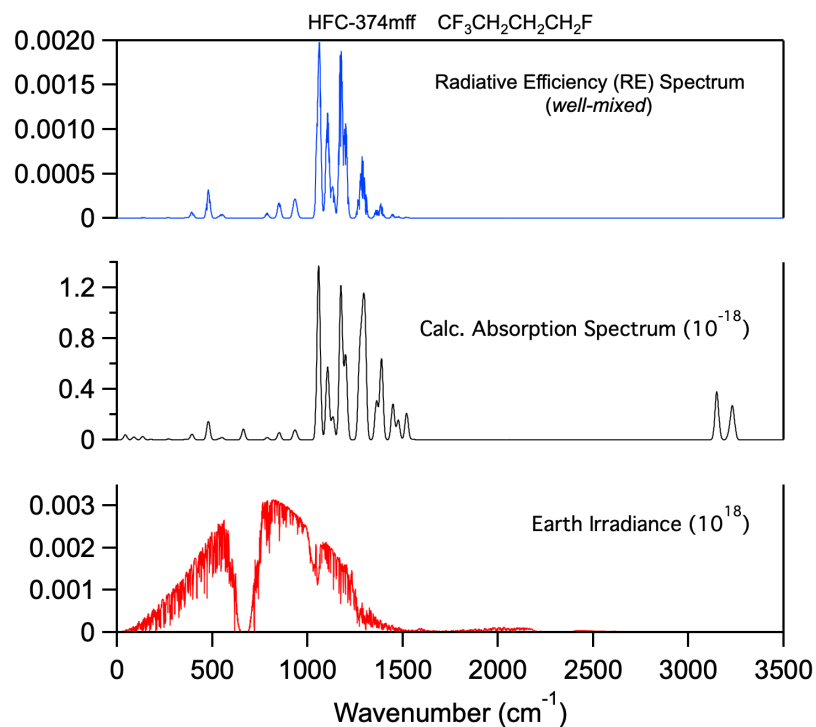
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
43	5.2
88	2.8
134	3.4
177	0.5
270	0.9
362	0.7
393	5.6
479	18.6
536	0.9
552	2.1
663	10.9
788	2.3
851	7.5
930	7.1
941	4.9
1058	176.5
1105	73.4
1133	23.3
1175	155
1200	84.1
1274	80.4
1289	82.1
1301	103.8
1362	38.9
1388	82
1448	36.4
1476	19.7
1510	0.3
1520	26.8
1553	0.8
3141	6.7
3148	40.1
3159	8.4
3212	5.9
3228	29
3240	12

Radiative Efficiency Spectrum



HFC-374pcf

Molecular Formula: CHF₂-CF₂-CH₂-CH₃
 CAS RN: 143969-51-1
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 0.79
 Tropospheric Atmospheric Lifetime (years): 0.81
 Stratospheric Atmospheric Lifetime (years): 27

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.177	0.136
Global Warming Potential (GWP _H):		
GWP ₂₀		187
GWP ₁₀₀		51
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		59
GTP ₅₀		9
GTP ₁₀₀		7

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 6.05 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 4.61 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.79 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.81 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 28.0 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

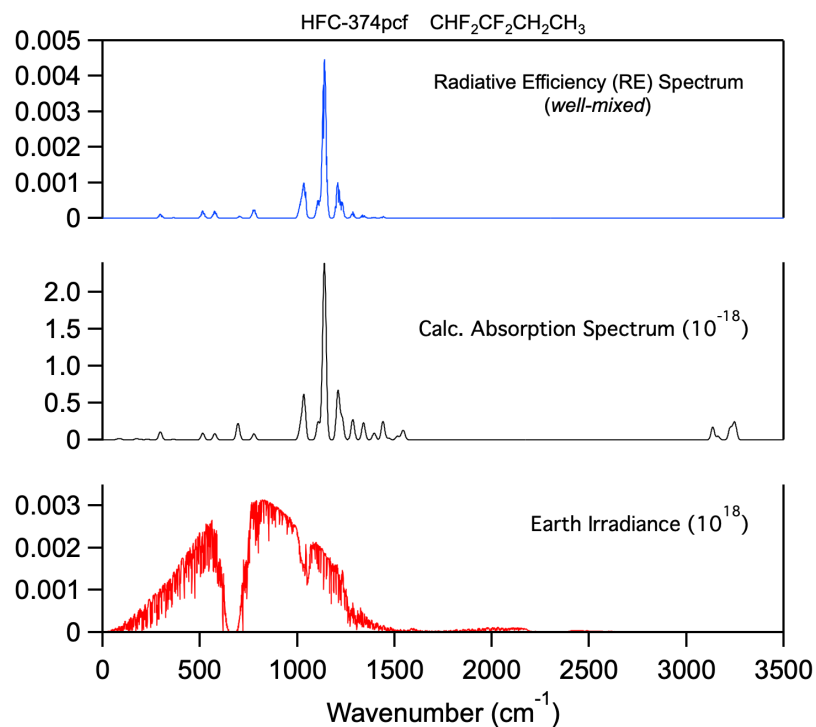
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
76	1.2
90	1.8
174	2.3
201	0.5
230	1.2
296	13.7
363	0.7
363	0.2
511	0.2
514	11.3
576	10.7
695	28.5
777	10.4
813	0.1
1016	23.1
1034	76.3
1107	31.2
1135	116.9
1141	207.3
1209	84.6
1230	37
1285	35
1340	29.7
1395	11.9
1440	29.3
1443	2.9
1469	2.9
1514	6.1
1535	5.2
1546	13.9
3135	22
3162	6.1
3224	19.3
3228	0.3
3242	18.5
3252	18.2

Radiative Efficiency Spectrum



HFC-374pcc

Molecular Formula: CHF₂-CHF-CHF-CH₃
 CAS RN: 161791-16-8
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 0.91
 Tropospheric Atmospheric Lifetime (years): 0.94
 Stratospheric Atmospheric Lifetime (years): 30

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.157	0.125
Global Warming Potential (GWP _H):		
GWP ₂₀		198
GWP ₁₀₀		54
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		63
GTP ₅₀		9
GTP ₁₀₀		7

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 5.28 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 4.00 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.91 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.94 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 31.8 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

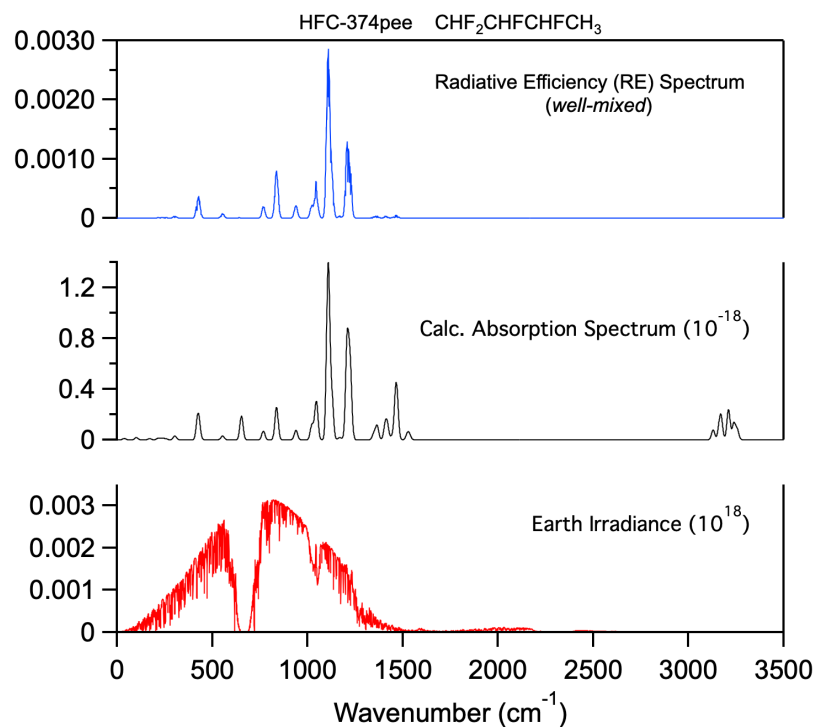
$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

$$k_{\text{Rec}}(T) = NA$$

Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
38	1.4
101	2.3
171	1.2
216	1.7
238	1.6
256	1
303	3.9
424	22
432	7.3
554	3.9
653	23.9
768	8.7
837	33.1
939	9.7
1023	15.3
1046	38.8
1108	175.7
1127	43.3
1169	2.5
1208	98.1
1224	68.9
1348	6.2
1365	14
1407	12
1418	14.2
1443	3.2
1463	38.9
1470	23.9
1525	6.3
1536	3.7
3129	9.9
3161	9.5
3171	20.7
3210	30.7
3238	16.5
3256	10

Radiative Efficiency Spectrum



HFC-374pef

Molecular Formula: CHF₂-CHF-CH₂-CH₂F
 CAS RN: 161791-17-9
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 0.86
 Tropospheric Atmospheric Lifetime (years): 0.89
 Stratospheric Atmospheric Lifetime (years): 29

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.174	0.137
Global Warming Potential (GWP _H):		
GWP ₂₀		205
GWP ₁₀₀		56
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		65
GTP ₅₀		9
GTP ₁₀₀		8

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 5.55 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 4.21 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.86 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.89 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 30.3 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

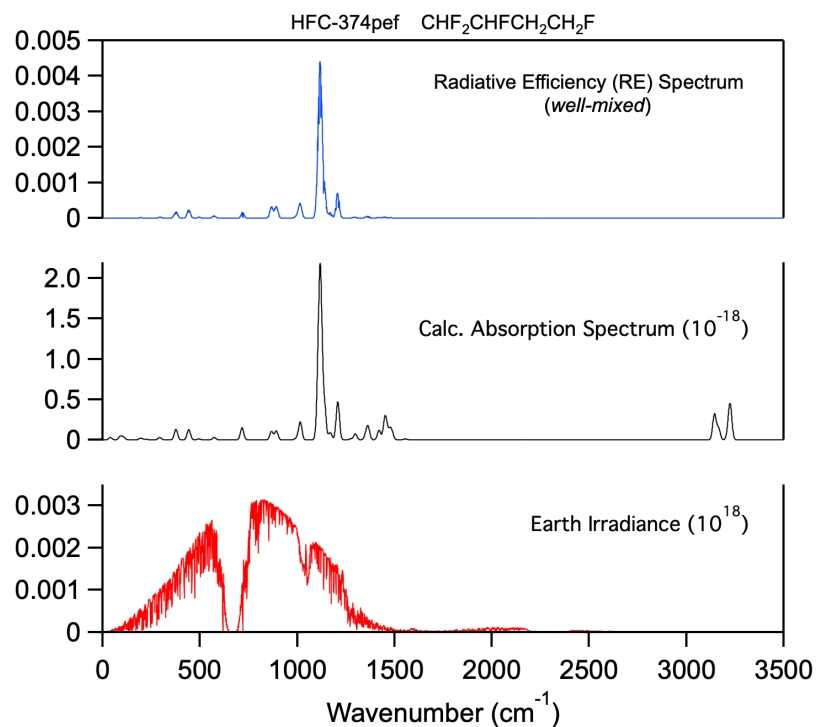
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
39	3.6
91	5.9
108	3.8
195	2.9
220	1.2
293	3.7
376	16.5
442	16.4
494	1.4
573	3.6
716	19.3
867	13.4
892	14.2
995	2.6
1015	28.4
1108	83.5
1119	238.1
1139	55.6
1169	11.6
1208	60.2
1275	1.4
1298	9.2
1353	8.2
1364	18.6
1420	15.2
1450	31.5
1460	12.5
1477	13.8
1487	8.5
1555	1.4
3141	17.6
3146	24.9
3165	17.9
3216	15.5
3224	28.1
3227	21.4

Radiative Efficiency Spectrum



HFC-374pfc

Molecular Formula: CHF₂-CH₂-CF₂-CH₃
 CAS RN: 625-09-2
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 3.00
 Tropospheric Atmospheric Lifetime (years): 3.12
 Stratospheric Atmospheric Lifetime (years): 82

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.183	0.178
Global Warming Potential (GWP _H):		
GWP ₂₀		926
GWP ₁₀₀		252
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		394
GTP ₅₀		46
GTP ₁₀₀		35

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.68 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.20 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 3.02 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 3.12 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 94.0 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

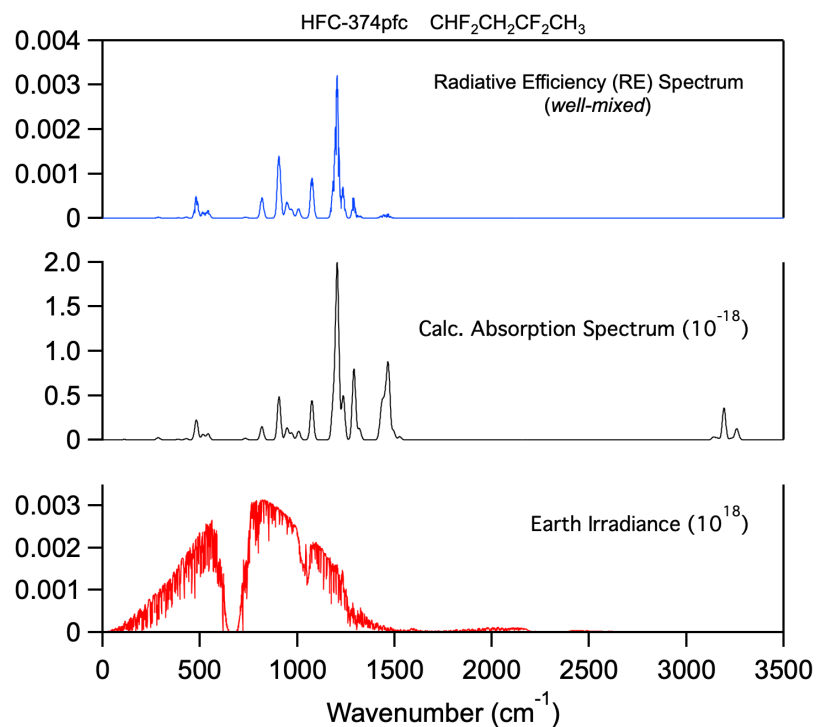
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
49	0.3
111	0.5
163	0.2
235	0.1
285	3.1
311	0.1
387	0.7
429	1.7
481	29
515	7.9
541	8.8
733	2.1
818	19
906	62.1
947	17.2
971	9.7
1007	12.4
1075	56.4
1185	56.3
1205	252.5
1236	63.8
1291	102.8
1319	15.9
1429	22.7
1439	38.7
1454	44.8
1468	98.8
1494	12.7
1523	0.5
1526	4
3139	4
3158	2.7
3193	46.4
3230	2.5
3255	10.1
3263	7.8

Radiative Efficiency Spectrum



HFC-374pfe

Molecular Formula: CHF₂-CH₂-CHF-CH₂F
 CAS RN: 161791-18-0
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 0.75
 Tropospheric Atmospheric Lifetime (years): 0.77
 Stratospheric Atmospheric Lifetime (years): 26

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.166	0.126
Global Warming Potential (GWP _H):		
GWP ₂₀		164
GWP ₁₀₀		45
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		51
GTP ₅₀		8
GTP ₁₀₀		6

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 6.36 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 4.85 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.75 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.77 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 26.7 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{¹D})} = 617 \text{ years}$$

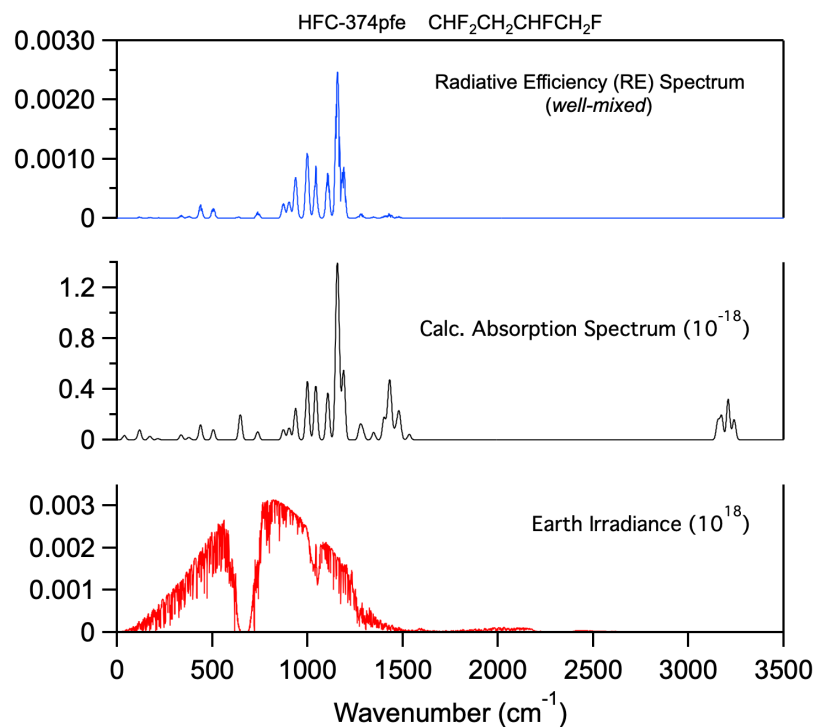
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
38	4.3
97	0.3
118	10.1
172	3.6
214	1.2
336	4.9
377	2.5
438	15.3
505	10.3
647	25.4
738	8.1
873	10.3
903	11.9
937	31.7
999	59.3
1043	54.4
1106	47.6
1154	141.2
1164	64.3
1189	69.5
1275	13.6
1290	9.3
1347	7.6
1401	21.9
1423	25.6
1434	47.4
1457	8.7
1475	19.5
1485	15.3
1534	5.7
3153	15
3159	4.8
3174	23
3208	41
3234	3
3240	18.1

Radiative Efficiency Spectrum



HFC-37qce

Molecular Formula: CH₂F-CF₂-CHF-CH₃
 CAS RN: 161791-20-4
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 1.54
 Tropospheric Atmospheric Lifetime (years): 1.59
 Stratospheric Atmospheric Lifetime (years): 47

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.159	0.141
Global Warming Potential (GWP _H):		
GWP ₂₀		377
GWP ₁₀₀		103
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		130
GTP ₅₀		18
GTP ₁₀₀		14

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 3.19 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 2.36 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.54 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.59 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 51.2 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

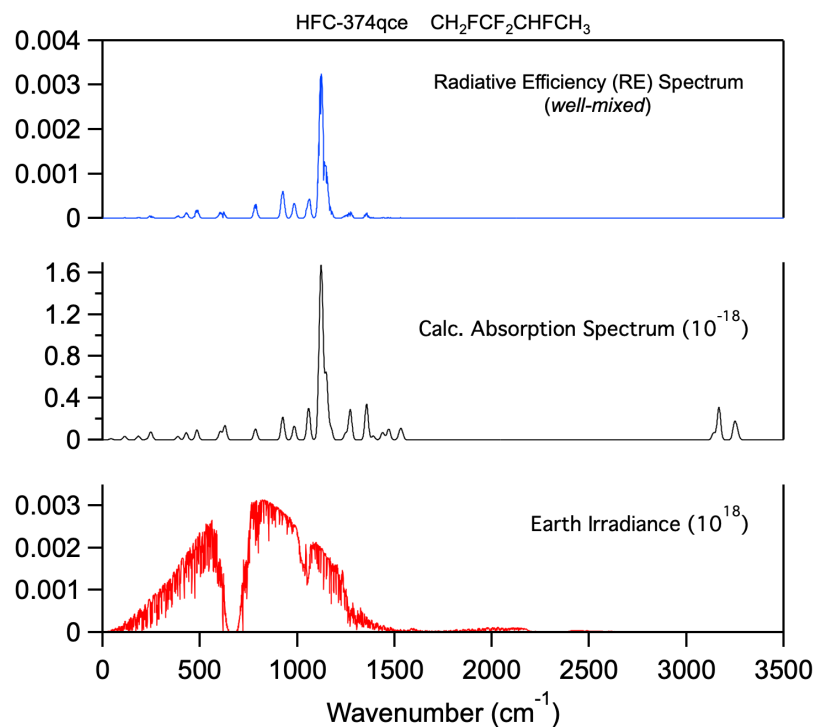
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
43	1.3
113	4.4
183	4.5
228	0.8
247	9.5
257	0.3
330	0
386	4.1
429	8.7
484	12
604	10.2
628	17.3
785	13.4
925	27.9
984	16.8
1058	38.7
1116	105.5
1126	147.1
1149	78.5
1172	14.9
1248	7.9
1272	37.1
1356	43.8
1390	4.6
1438	8.8
1455	1.6
1470	12.9
1526	6.5
1534	5.5
1538	4.8
3139	8.3
3162	9.4
3168	32.3
3245	13.2
3251	9.1
3262	8.5

Radiative Efficiency Spectrum



HFC-374qec

Molecular Formula: CH₂F-CHF-CF₂-CH₃
 CAS RN: 161791-19-1
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 2.29
 Tropospheric Atmospheric Lifetime (years): 2.37
 Stratospheric Atmospheric Lifetime (years): 66

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.160	0.151
Global Warming Potential (GWP _H):		
GWP ₂₀		601
GWP ₁₀₀		163
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		230
GTP ₅₀		29
GTP ₁₀₀		23

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 2.17 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.58 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 2.30 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 2.37 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 73.5 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

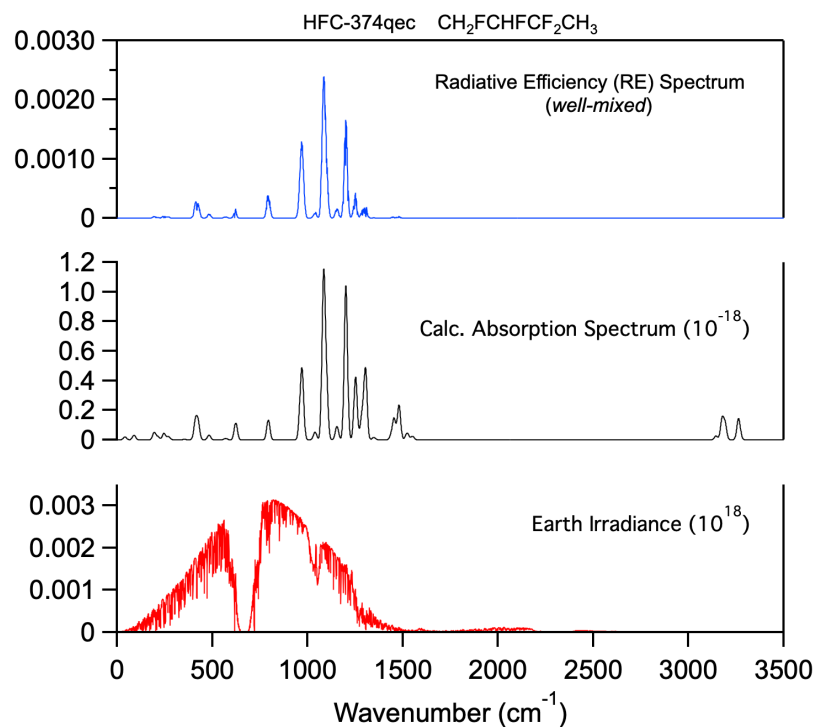
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
41	2.5
89	4
195	6.3
215	2.6
246	5.6
270	2.8
353	0.4
411	15.3
425	14.5
483	4.1
570	1.2
623	14.6
794	17.2
962	20.4
972	50.9
1039	6.7
1084	137.8
1099	44.2
1154	11.6
1201	133.6
1252	54.6
1285	20.3
1304	61.2
1348	2.1
1439	3.3
1454	18.1
1480	30.2
1521	4.4
1527	1.7
1551	3
3144	3.3
3176	17.5
3192	13.3
3260	3.4
3262	13.4
3271	3.1

Radiative Efficiency Spectrum



HFC-374qcf

Molecular Formula: CH₂F-CF₂-CH₂-CH₂F
 CAS RN: 161791-21-5
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 1.07
 Tropospheric Atmospheric Lifetime (years): 1.11
 Stratospheric Atmospheric Lifetime (years): 35

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.161	0.133
Global Warming Potential (GWP _H):		
GWP ₂₀		248
GWP ₁₀₀		68
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		81
GTP ₅₀		12
GTP ₁₀₀		9

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 4.51 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.39 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.07 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.11 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 36.9 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

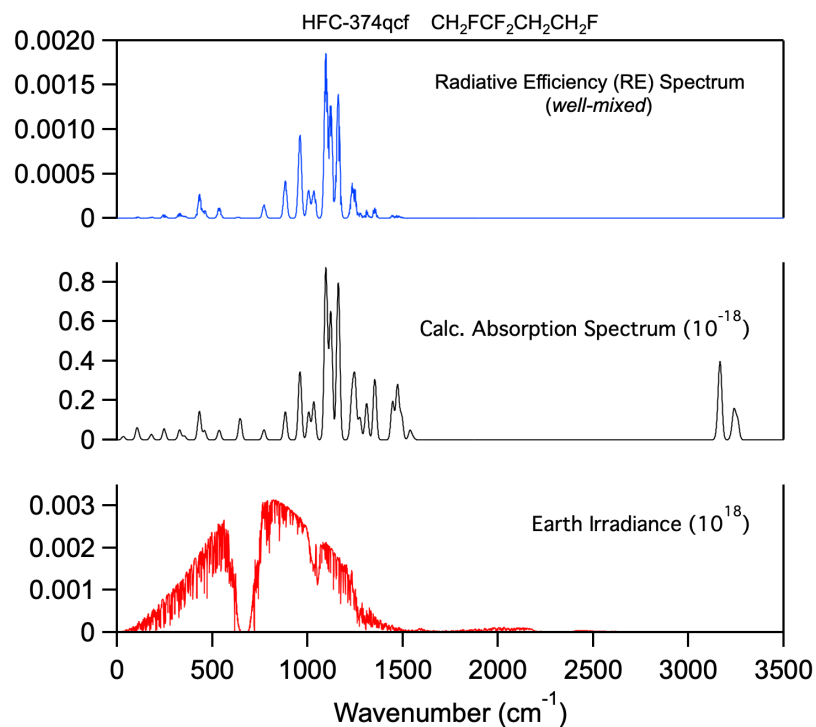
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
33	2.1
105	7.8
120	0.5
180	3.5
247	7.1
328	6.4
353	2.5
432	18.5
459	5.9
536	6.1
646	14
771	6.5
883	18.2
960	44.3
1006	18
1033	24.6
1096	111.3
1122	82.7
1161	102.5
1232	25.4
1248	38.7
1274	14.4
1310	23.8
1353	39.5
1445	13.2
1448	11.8
1472	35
1493	15.4
1538	6
1553	1.5
3150	4
3163	35.8
3171	19.6
3229	4.3
3240	17.4
3258	12.5

Radiative Efficiency Spectrum



HFC-374qee

Molecular Formula: CH₂F-CHF-CHF-CH₂F
 CAS RN: 119382-47-7
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 1.20
 Tropospheric Atmospheric Lifetime (years): 1.24
 Stratospheric Atmospheric Lifetime (years): 38

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.142	0.121
Global Warming Potential (GWP _H):		
GWP ₂₀		252
GWP ₁₀₀		69
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		84
GTP ₅₀		12
GTP ₁₀₀		9

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 4.04 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.02 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.20 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.24 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 41.0 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

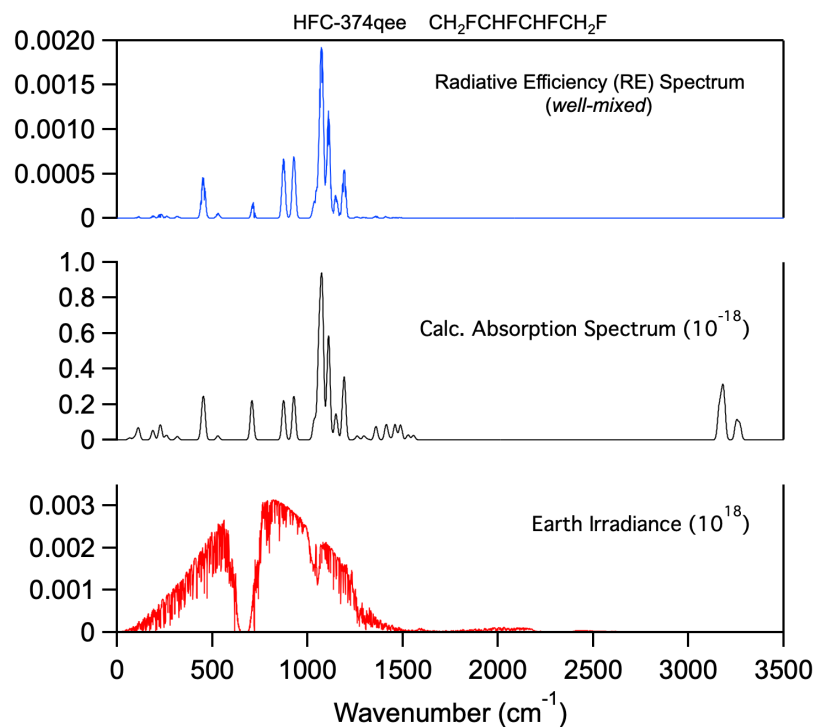
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
66	1.4
92	1.8
111	8.6
188	6.8
227	10.8
259	3.3
316	2.4
447	13.6
456	22.2
529	2.9
708	28.2
874	28.2
928	31.6
1035	14.2
1060	66.8
1076	106.2
1110	75.4
1149	18.8
1187	11.1
1193	36.3
1261	2.8
1296	2.7
1315	0.5
1359	9.7
1413	10.9
1430	1.2
1459	11
1488	10.6
1528	3.5
1556	3.1
3160	18.6
3172	15.7
3182	20.8
3188	13.6
3251	13.2
3269	11

Radiative Efficiency Spectrum



HFC-374scc

Molecular Formula: CH₃-CF₂-CF₂-CH₃
 CAS RN: 421-74-9
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 17.6
 Tropospheric Atmospheric Lifetime (years): 18.8
 Stratospheric Atmospheric Lifetime (years): 268

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.199	0.212
Global Warming Potential (GWP _H):		
GWP ₂₀		4410
GWP ₁₀₀		1759
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		3865
GTP ₅₀		1237
GTP ₁₀₀		321

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 3.08 \times 10^{-15}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.99 \times 10^{-15}$$

$$\tau_{\text{Global}}^{\text{OH}} = 18.1 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 18.8 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 474.4 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

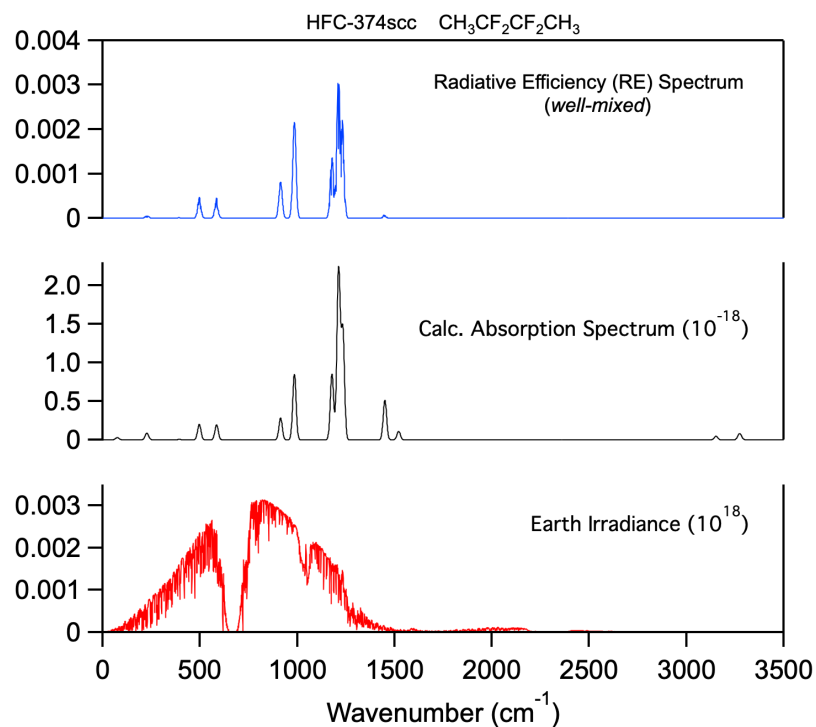
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
75	3.9
202	0
209	0
226	10.2
235	1.1
326	0
355	0
361	0
393	0.7
496	25.8
530	0
585	24.9
590	0
727	0
914	36.3
971	0.1
985	108.8
995	0
1178	108.8
1212	281.1
1215	0.3
1234	179.5
1298	0
1403	0
1450	66.1
1469	0
1516	0
1519	5.4
1522	9
1537	0
3151	3.5
3153	2.6
3269	2.9
3271	4.7
3277	1.9
3281	2.4

Radiative Efficiency Spectrum



HFC-374pff

Molecular Formula: CHF₂-CH₂-CH₂-CHF₂
 CAS RN: 161879-84-1
 Molecular Weight: 130.08

Global Atmospheric Lifetime (years): 1.38
 Tropospheric Atmospheric Lifetime (years): 1.43
 Stratospheric Atmospheric Lifetime (years): 43

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.205	0.179
Global Warming Potential (GWP _H):		
GWP ₂₀		432
GWP ₁₀₀		117
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		146
GTP ₅₀		20
GTP ₁₀₀		16

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(\text{T}) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 3.52 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 2.62 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.39 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.43 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 46.6 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(\text{T}) = 6.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 617 \text{ years}$$

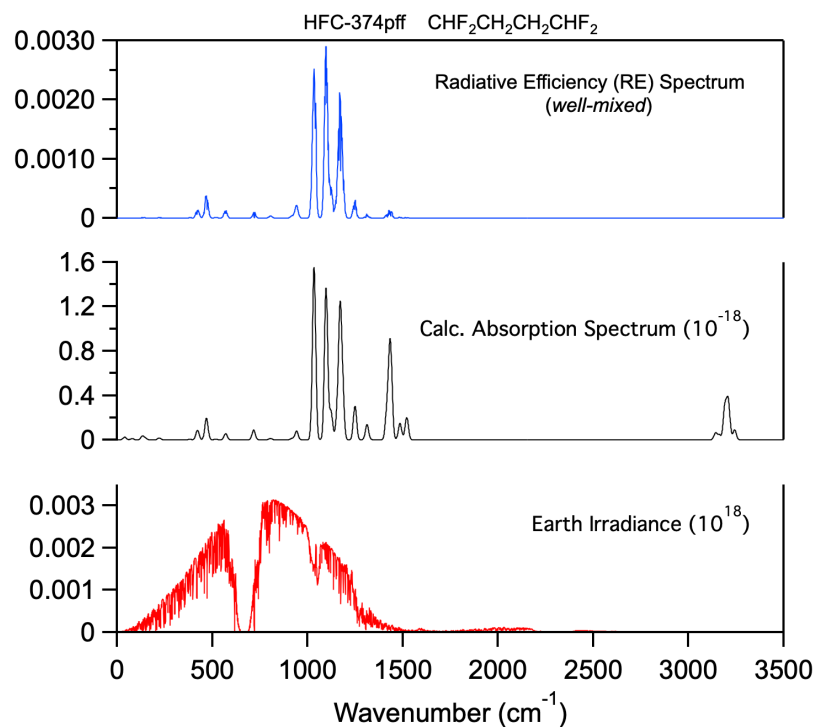
$$k_{\text{Rec}}(\text{T}) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
40	3.1
79	1.3
133	4.2
149	1.6
221	2.1
382	0.6
422	10.9
469	25.2
518	0.7
570	7
717	11.2
805	1.6
918	1.6
942	10.2
1034	199.8
1097	175.1
1123	32.7
1154	20
1170	138.2
1183	54.6
1249	39
1312	17.7
1346	0.3
1416	26.9
1426	21.7
1434	80.9
1440	24.9
1485	19
1511	1.9
1521	24.8
3142	8
3162	5.5
3191	37.7
3208	41.2
3216	4.7
3242	11.5

Radiative Efficiency Spectrum



HFC-383m

Molecular Formula: CH₃-CH₂-CH₂-CF₃
 CAS RN: 460-34-4
 Molecular Weight: 112.09

Global Atmospheric Lifetime (years): 0.19
 Tropospheric Atmospheric Lifetime (years): 0.19
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.151	0.064
Global Warming Potential (GWP _H):		
GWP ₂₀		25
GWP ₁₀₀		7
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		7
GTP ₅₀		1
GTP ₁₀₀		1

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 2.40 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.93 \times 10^{-13}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.19 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.19 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 7.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 528 \text{ years}$$

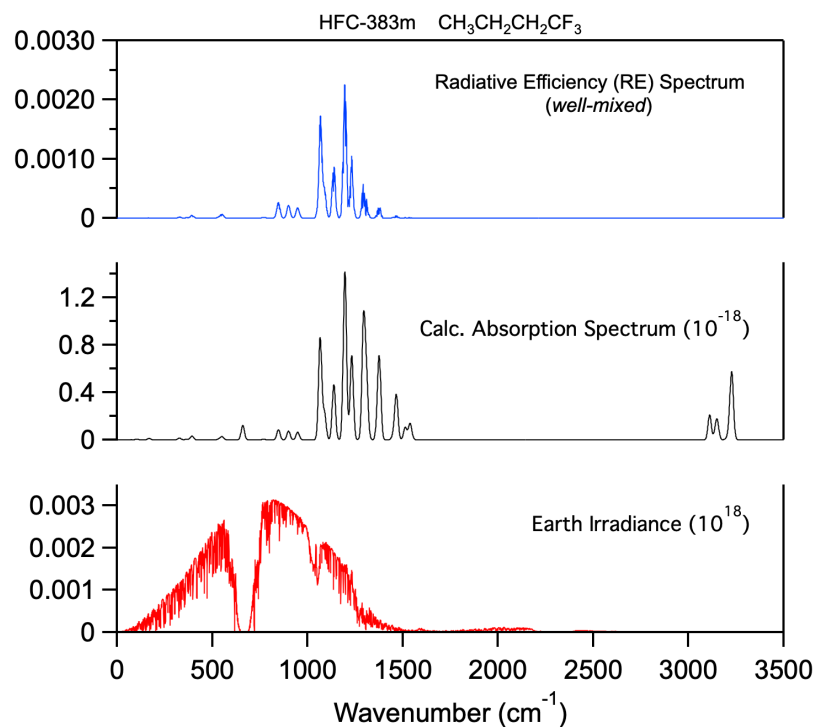
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
75	0.3
104	0.6
168	1.5
251	0
327	1.9
364	0.5
393	4
536	0.9
551	3.3
660	15.7
769	0.6
847	10.9
900	9.4
948	8.4
1066	110.4
1089	28.6
1138	59.9
1196	182.6
1232	91.8
1294	128.5
1310	60.2
1369	21.8
1377	76.4
1451	5.6
1466	48.2
1512	13.1
1530	3.3
1537	9
1542	7.5
3111	27
3141	8
3151	18.2
3198	1
3215	11.4
3225	30.5
3229	41

Radiative Efficiency Spectrum



HFC-383pe

Molecular Formula: CHF₂-CHF-CH₂-CH₃
 CAS RN: 66675-41-0
 Molecular Weight: 112.09

Global Atmospheric Lifetime (years): 0.48
 Tropospheric Atmospheric Lifetime (years): 0.49
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.137	0.090
Global Warming Potential (GWP _H):		
GWP ₂₀		88
GWP ₁₀₀		24
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		27
GTP ₅₀		4
GTP ₁₀₀		3

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 9.74 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 7.56 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.49 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.49 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 7.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 528 \text{ years}$$

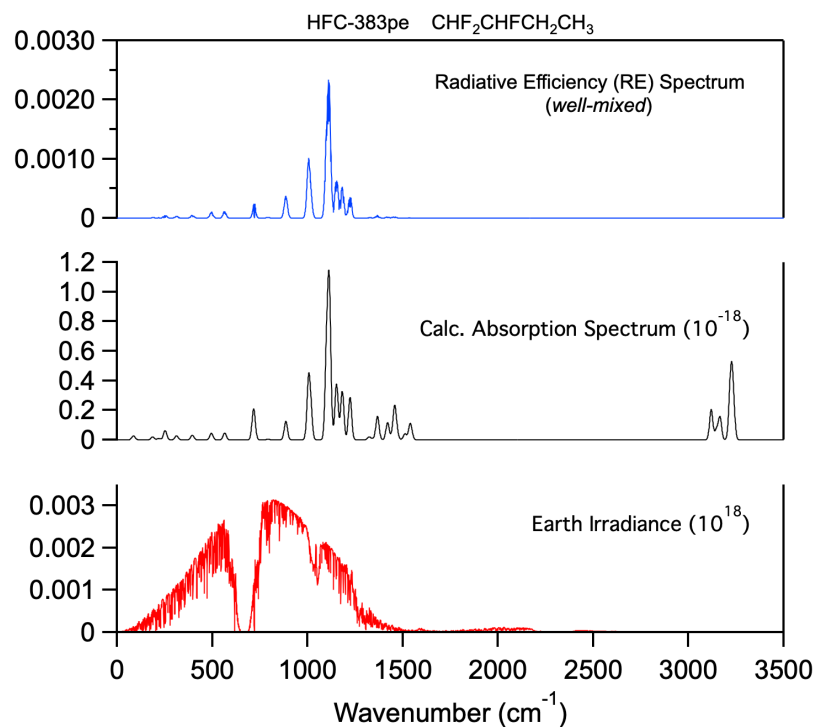
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
85	3.1
95	0.4
186	2.5
218	1.2
252	8
312	3.4
395	3.9
495	5.7
565	5.8
717	26.9
793	0.5
886	16.2
1005	48.6
1017	21.7
1100	69.4
1114	124.5
1152	48.2
1182	42
1223	37.1
1323	2.5
1343	0.8
1367	20.5
1420	15
1446	3.7
1458	28.1
1472	3.2
1511	5.1
1536	7.9
1543	7.7
3119	26.1
3146	8.6
3165	19.6
3211	1.6
3219	29.6
3227	35.5
3236	22.7

Radiative Efficiency Spectrum



HFC-383pfe

Molecular Formula: CHF₂-CH₂-CHF-CH₃
 CAS RN: 66675-42-1
 Molecular Weight: 112.09

Global Atmospheric Lifetime (years): 0.45
 Tropospheric Atmospheric Lifetime (years): 0.46
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.149	0.095
Global Warming Potential (GWP _H):		
GWP ₂₀		86
GWP ₁₀₀		23
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		26
GTP ₅₀		4
GTP ₁₀₀		3

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.06 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 8.22 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.46 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.46 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 7.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 528 \text{ years}$$

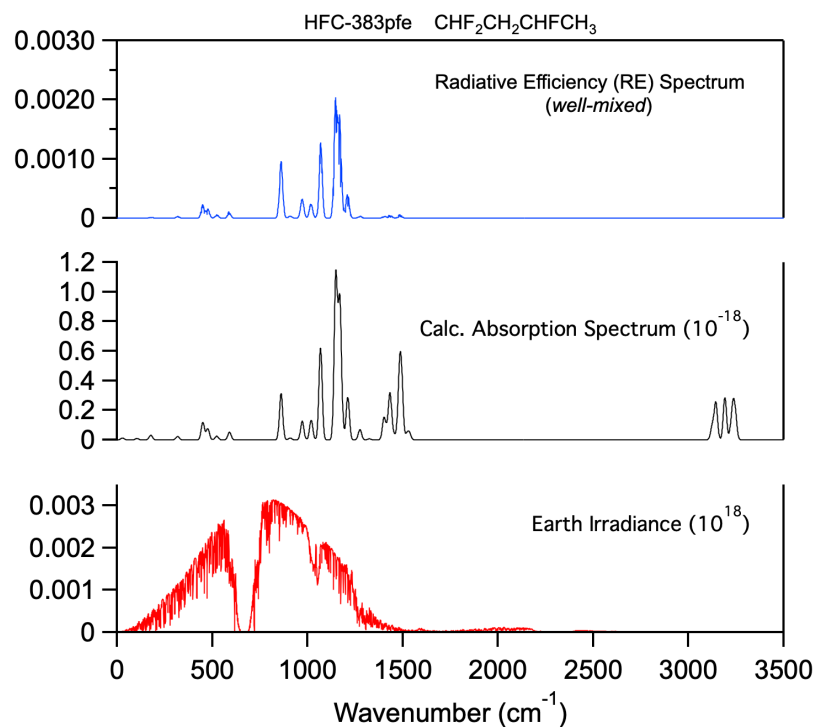
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
28	1.6
104	1.2
177	4.1
231	0.2
316	1.7
320	1.3
450	15
476	9.6
523	3.2
590	6.7
861	40.2
909	1.5
972	16.2
1019	16.9
1068	79.4
1148	141.2
1169	116.7
1182	8.3
1211	36.7
1275	8.9
1324	0.8
1401	18.7
1418	6.4
1433	39.4
1454	4.3
1482	47.2
1493	47.4
1522	5
1535	5.3
3124	11.1
3142	24.7
3147	8.5
3191	36.6
3223	7.1
3234	25.5
3246	18

Radiative Efficiency Spectrum



HFC-383pff

Molecular Formula: CHF₂-CH₂-CH₂-CH₂F
 CAS RN: 66587-70-0
 Molecular Weight: 112.09

Global Atmospheric Lifetime (years): 0.20
 Tropospheric Atmospheric Lifetime (years): 0.20
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.229	0.099
Global Warming Potential (GWP _H):		
GWP ₂₀		40
GWP ₁₀₀		11
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		12
GTP ₅₀		2
GTP ₁₀₀		1

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 2.33 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.87 \times 10^{-13}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.20 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.20 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 7.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 528 \text{ years}$$

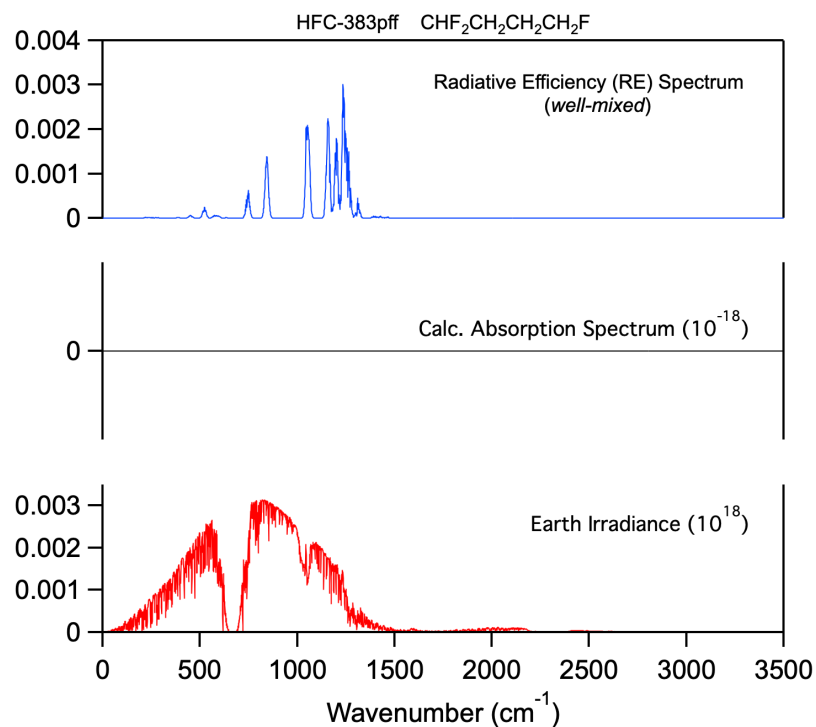
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
35	2.8
81	1.6
98	1.4
167	5.6
195	4.5
248	5.5
342	13
410	3.6
458	19.1
506	7.5
567	4.8
660	28.1
759	2.5
875	10.9
916	16.5
1003	45.5
1027	31.2
1111	85.5
1137	276.3
1145	65.1
1173	144.8
1207	33
1279	6
1341	9.7
1359	37
1416	44.4
1418	16.5
1429	52
1461	2.6
1482	19.8
1485	11.4
3157	0.4
3194	6.4
3206	37.6
3222	25.5
3232	1.6

Radiative Efficiency Spectrum



HFC-383qcf

Molecular Formula: CH₂F-CF₂-CH₂-CH₃
 CAS RN: 66587-71-1
 Molecular Weight: 112.09

Global Atmospheric Lifetime (years): 1.22
 Tropospheric Atmospheric Lifetime (years): 1.26
 Stratospheric Atmospheric Lifetime (years): 38

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.129	0.110
Global Warming Potential (GWP _H):		
GWP ₂₀		270
GWP ₁₀₀		73
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		89
GTP ₅₀		13
GTP ₁₀₀		10

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 3.98 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 2.98 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.22 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.26 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 41.5 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 7.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 528 \text{ years}$$

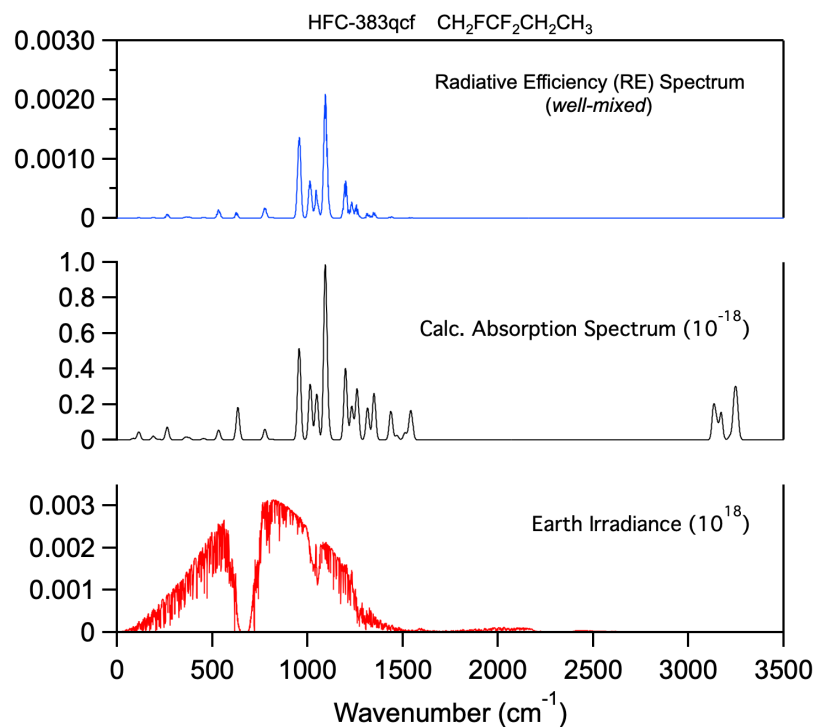
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
85	1
114	5.7
190	2.6
216	0.5
263	9.3
359	1.9
378	1.5
454	1
533	7
634	23.6
776	7.6
811	0.5
956	66.2
1014	40.3
1048	33
1093	125.5
1110	10
1199	51.7
1232	24.2
1260	36.9
1315	23.2
1349	33.7
1437	19.9
1447	1.4
1469	3.1
1511	5
1535	4.5
1538	6.9
1546	13.3
3132	23.8
3148	12.1
3171	19.5
3218	2.6
3239	19.2
3248	19
3257	15.2

Radiative Efficiency Spectrum



HFC-383qee

Molecular Formula: CH₂F-CHF-CHF-CH₃
 CAS RN: 66587-72-2
 Molecular Weight: 112.09

Global Atmospheric Lifetime (years): 0.37
 Tropospheric Atmospheric Lifetime (years): 0.37
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.112	0.066
Global Warming Potential (GWP _H):		
GWP ₂₀		48
GWP ₁₀₀		13
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		15
GTP ₅₀		2
GTP ₁₀₀		2

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.28 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.01 \times 10^{-13}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.37 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.37 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 7.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 528 \text{ years}$$

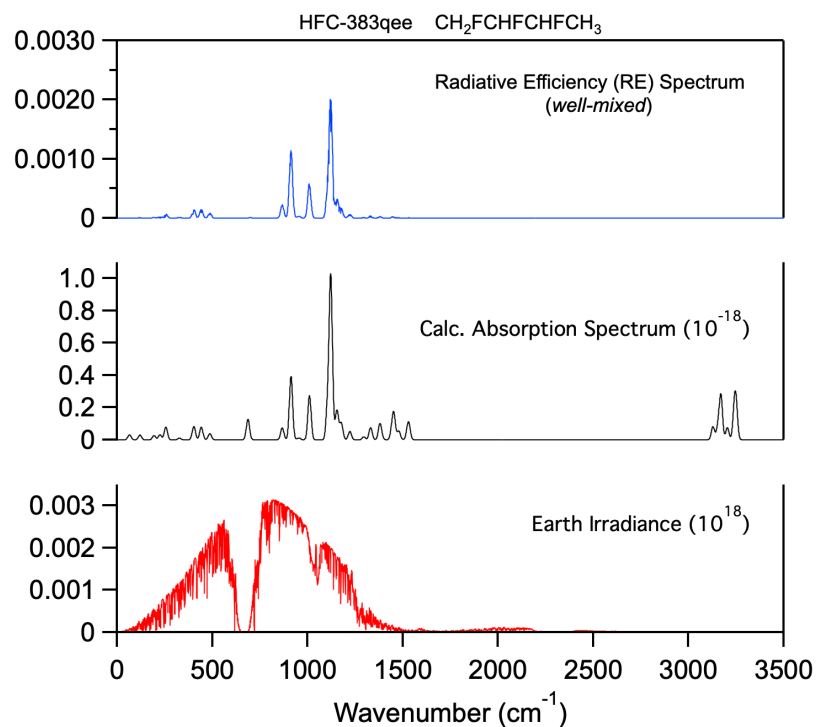
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
65	4
120	3.8
194	3.3
225	3.9
256	9.9
327	1.4
403	10.7
442	10.2
487	4.9
687	16.4
867	9.5
913	50.6
954	1.5
1010	35.1
1106	27.7
1122	127.4
1154	23.4
1177	13.3
1222	6.7
1295	2.3
1331	9.6
1380	12.9
1395	0.5
1443	6.6
1453	18.9
1479	6.9
1526	6.1
1531	4.8
1533	4.4
3128	10.4
3154	9.3
3170	35.1
3204	9.8
3241	21.9
3249	5.9
3250	16.7

Radiative Efficiency Spectrum



HFC-383qef

Molecular Formula: CH₂F-CHF-CH₂-CH₂F
 CAS RN: 66587-73-3
 Molecular Weight: 112.09

Global Atmospheric Lifetime (years): 0.49
 Tropospheric Atmospheric Lifetime (years): 0.50
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.108	0.071
Global Warming Potential (GWP _H):		
GWP ₂₀		71
GWP ₁₀₀		19
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		22
GTP ₅₀		3
GTP ₁₀₀		3

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 9.59 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 7.44 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.50 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.50 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 7.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 528 \text{ years}$$

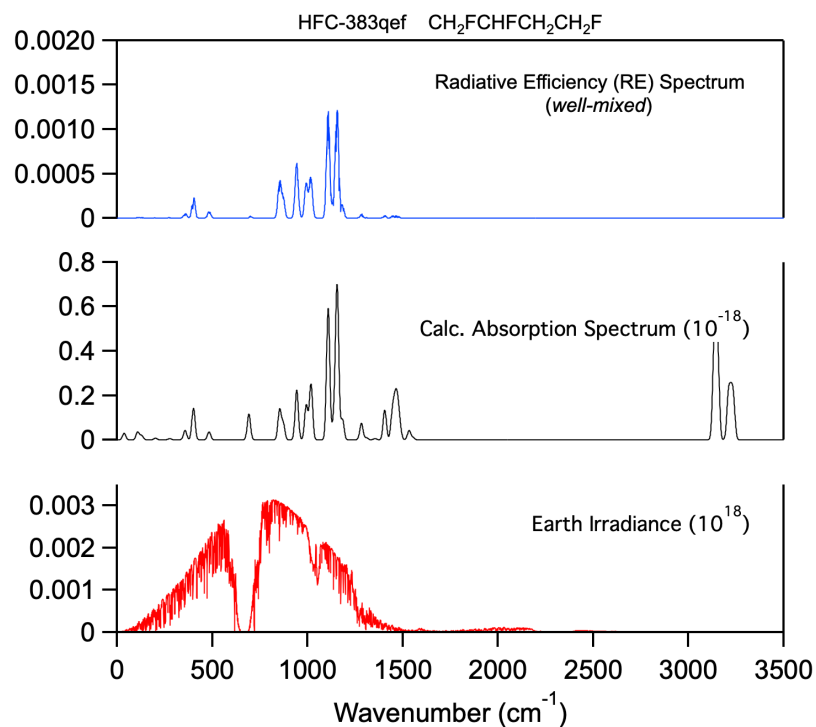
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
37	3.8
108	4.5
129	2.4
201	0.9
276	0.7
357	5.4
401	18.2
483	4.5
692	14.9
853	17.2
872	9.3
943	28.8
993	20
1018	31.9
1108	76.1
1139	11.8
1155	87.7
1183	11.7
1272	0.3
1283	9.4
1309	1.2
1354	0.7
1405	17.3
1445	13.9
1458	16.4
1470	19.1
1483	9.1
1533	5.4
1553	1.3
3130	3
3133	24.9
3140	38.2
3153	49
3209	23.5
3223	20.6
3236	21

Radiative Efficiency Spectrum



HFC-383qfc

Molecular Formula: CH₂F-CH₂-CF₂-CH₃
 CAS RN: 66587-74-4
 Molecular Weight: 112.09

Global Atmospheric Lifetime (years): 1.10
 Tropospheric Atmospheric Lifetime (years): 1.14
 Stratospheric Atmospheric Lifetime (years): 35

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.130	0.108
Global Warming Potential (GWP _H):		
GWP ₂₀		241
GWP ₁₀₀		66
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		79
GTP ₅₀		11
GTP ₁₀₀		9

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(\text{T}) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 4.39 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.30 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.10 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.14 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 37.8 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(\text{T}) = 7.0 \times 10^{-11}$$

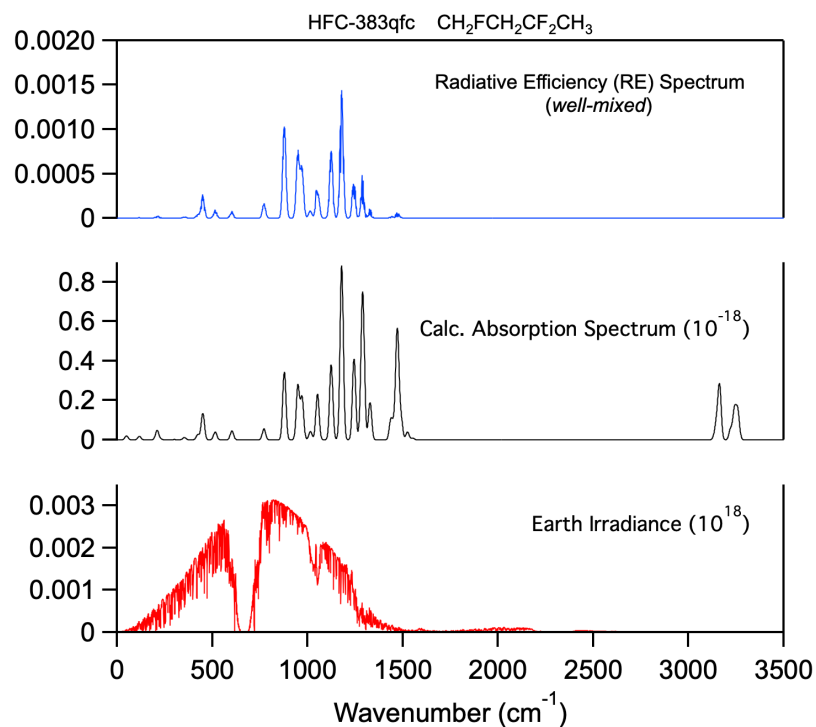
$$\tau_{\text{O}(\text{1D})} = 528 \text{ years}$$

$$k_{\text{Rec}}(\text{T}) = NA$$

Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
49	2.5
117	2.2
210	6.2
227	0.5
301	0.2
353	1.5
424	3.3
450	17.1
515	5.1
603	5.9
771	7.1
878	44.2
949	35
971	27.2
1015	5.4
1052	29.9
1124	49
1179	113.4
1244	52.3
1284	28.9
1291	74.1
1328	24.2
1437	12.4
1453	8.4
1471	70.7
1490	14.5
1523	1.1
1525	3.9
1552	1.1
3139	3
3148	9.3
3163	34.5
3221	6.8
3241	18.6
3256	10.6
3261	9

Radiative Efficiency Spectrum



HFC-383sce

Molecular Formula: CH₃-CF₂-CHF-CH₃
 CAS RN: 66587-75-5
 Molecular Weight: 112.09

Global Atmospheric Lifetime (years): 1.19
 Tropospheric Atmospheric Lifetime (years): 1.23
 Stratospheric Atmospheric Lifetime (years): 38

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.139	0.118
Global Warming Potential (GWP _H):		
GWP ₂₀		283
GWP ₁₀₀		77
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		94
GTP ₅₀		13
GTP ₁₀₀		11

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(\text{T}) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 4.06 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.04 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 1.20 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 1.23 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 40.7 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(\text{T}) = 7.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 528 \text{ years}$$

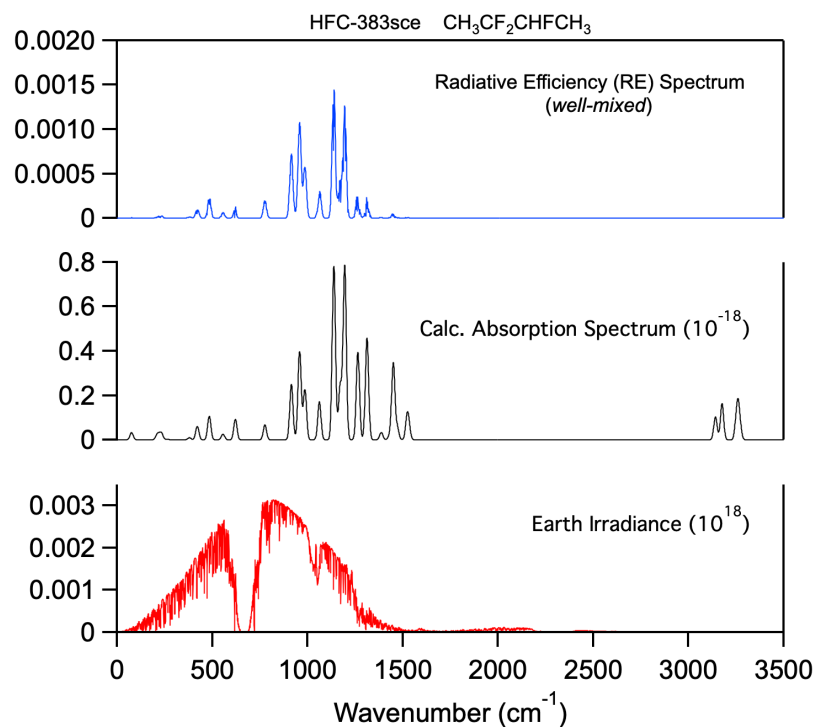
$$k_{\text{Rec}}(\text{T}) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
76	4.2
210	2.8
221	1.8
233	3.6
262	0.4
332	0
380	1.2
421	7.8
484	13.7
556	3.3
621	11.7
776	8.7
915	32.2
958	50.8
986	28.9
1062	22
1138	100.6
1171	31.1
1195	100.5
1264	50.7
1312	58.9
1387	4.3
1430	2.2
1450	44.3
1471	6.7
1519	2
1523	8.2
1528	6
1536	2.3
3140	9.7
3145	4
3176	21
3251	9.5
3259	6.7
3263	11.4
3273	3.5

Radiative Efficiency Spectrum



HFC-392pff

Molecular Formula: CH₃-CH₂-CH₂-CHF₂
 CAS RN: 2358-38-5
 Molecular Weight: 94.10

Global Atmospheric Lifetime (years): 0.17
 Tropospheric Atmospheric Lifetime (years): 0.17
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.095	0.037
Global Warming Potential (GWP _H):		
GWP ₂₀		15
GWP ₁₀₀		4
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		4
GTP ₅₀		1
GTP ₁₀₀		1

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 2.78 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 2.24 \times 10^{-13}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.17 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.17 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 8.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 462 \text{ years}$$

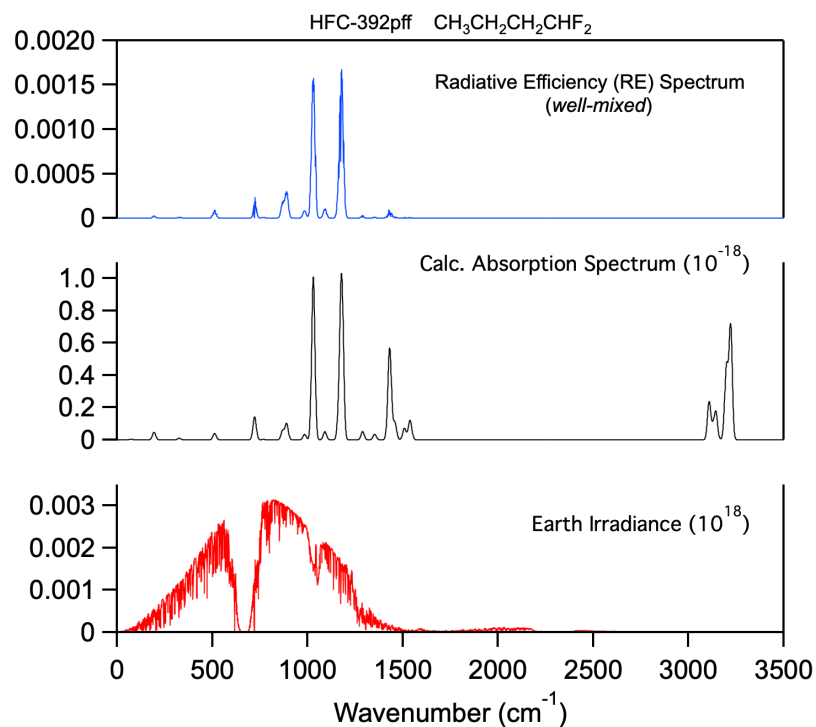
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
73	0.5
114	0.1
194	6
254	0
326	1.2
385	0.1
512	5.1
722	18.4
768	0.3
869	7.2
890	12.9
984	4.2
1030	129.3
1091	6.5
1165	19.4
1176	77
1183	61.3
1289	6.5
1352	4.2
1357	0.3
1426	25.6
1433	53.1
1449	1.7
1459	12.9
1508	9.3
1530	1.9
1536	8.6
1542	6.7
3108	30
3128	9.5
3144	21.2
3190	8.2
3200	52.4
3202	1
3220	34.9
3222	55.7

Radiative Efficiency Spectrum



HFC-392qef

Molecular Formula: CH₃-CH₂-CHF-CH₂F
 CAS RN: 686-65-7
 Molecular Weight: 94.10

Global Atmospheric Lifetime (years): 0.28
 Tropospheric Atmospheric Lifetime (years): 0.28
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.076	0.040
Global Warming Potential (GWP _H):		
GWP ₂₀		26
GWP ₁₀₀		7
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		8
GTP ₅₀		1
GTP ₁₀₀		1

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.69 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.34 \times 10^{-13}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.28 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.28 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 8.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 462 \text{ years}$$

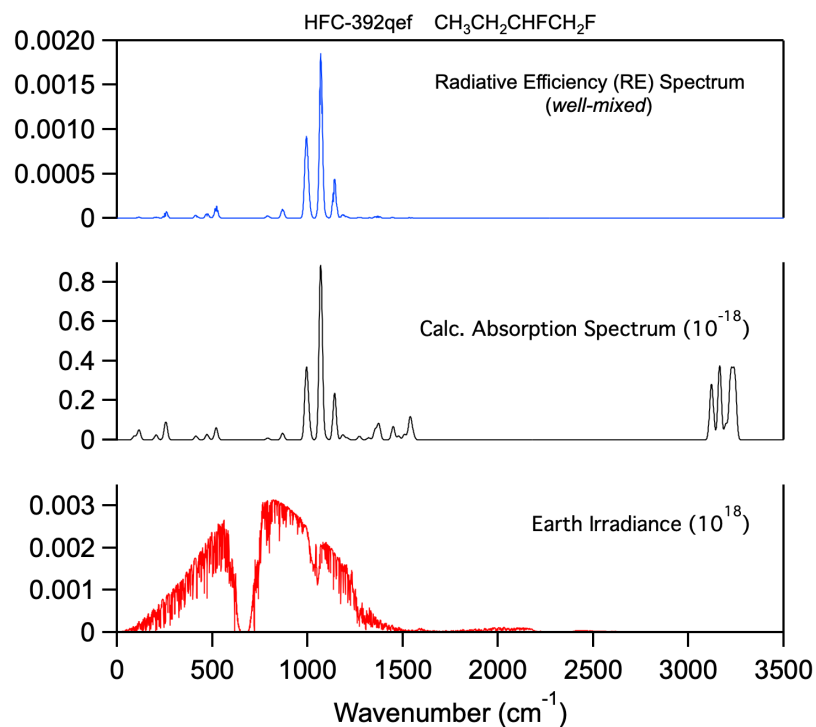
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
91	2.5
115	6.4
205	3.1
246	0.3
256	11.5
414	2.4
472	3.5
520	7.8
791	1.1
869	4.2
993	42.8
1006	13.3
1069	113.9
1091	2.2
1142	30.4
1185	3.2
1207	1.3
1272	2.3
1321	1.3
1355	6.3
1374	10.3
1449	6.5
1450	2.2
1478	2.4
1509	3.6
1535	7.8
1542	8.1
1554	2.9
3118	28.3
3128	13.5
3160	15.3
3165	34.7
3196	10.2
3221	37.8
3235	23
3245	28.9

Radiative Efficiency Spectrum



HFC-392qfe

Molecular Formula: CH₃-CHF-CH₂-CH₂F
 CAS RN: 691-42-9
 Molecular Weight: 94.10

Global Atmospheric Lifetime (years): 0.31
 Tropospheric Atmospheric Lifetime (years): 0.32
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.080	0.044
Global Warming Potential (GWP _H):		
GWP ₂₀		33
GWP ₁₀₀		9
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		10
GTP ₅₀		1
GTP ₁₀₀		1

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.50 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.18 \times 10^{-13}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.32 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.32 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 8.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 462 \text{ years}$$

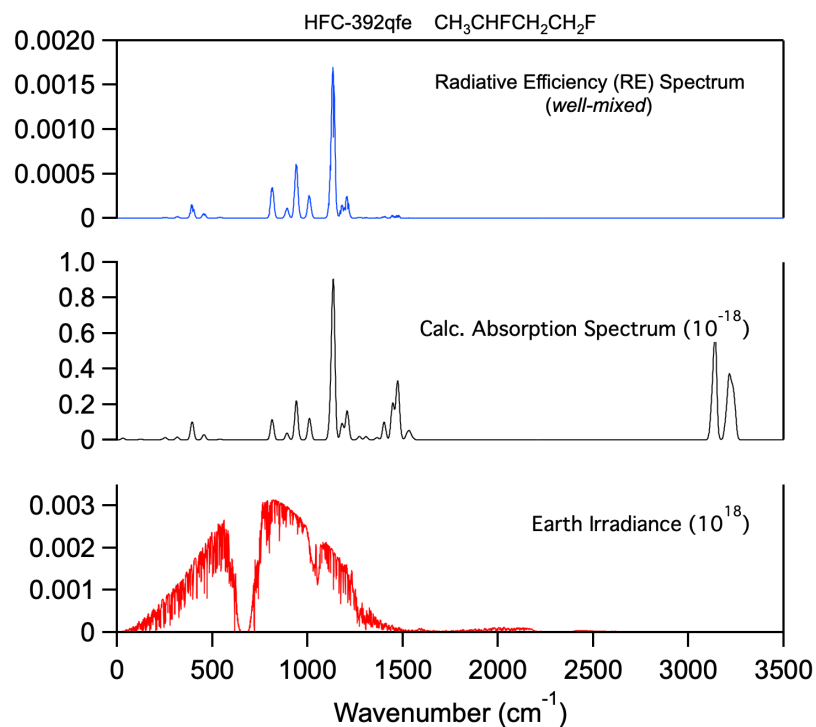
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
31	1.2
124	0.5
233	0.2
253	1.6
316	1.9
394	12.9
456	3.7
540	0.5
814	14.6
892	4.9
941	28.2
999	0.1
1010	15.4
1120	17.1
1135	112.6
1181	11.7
1208	20.9
1272	2.4
1307	2.3
1364	1.6
1402	12.9
1446	22.8
1453	4.6
1472	37.1
1481	8.4
1522	3.5
1535	5.2
1550	1.4
3119	3.1
3123	20.8
3138	16.7
3140	59.3
3197	13.7
3213	40.4
3229	27.7
3242	20.2

Radiative Efficiency Spectrum



HFC-392qff

Molecular Formula: CH₂F-CH₂-CH₂-CH₂F
 CAS RN: 372-90-7
 Molecular Weight: 94.10

Global Atmospheric Lifetime (years): 0.11
 Tropospheric Atmospheric Lifetime (years): 0.11
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.090	0.026
Global Warming Potential (GWP _H):		
GWP ₂₀		7
GWP ₁₀₀		2
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		2
GTP ₅₀		0
GTP ₁₀₀		0

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 4.31 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.53 \times 10^{-13}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.11 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.11 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 8.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 462 \text{ years}$$

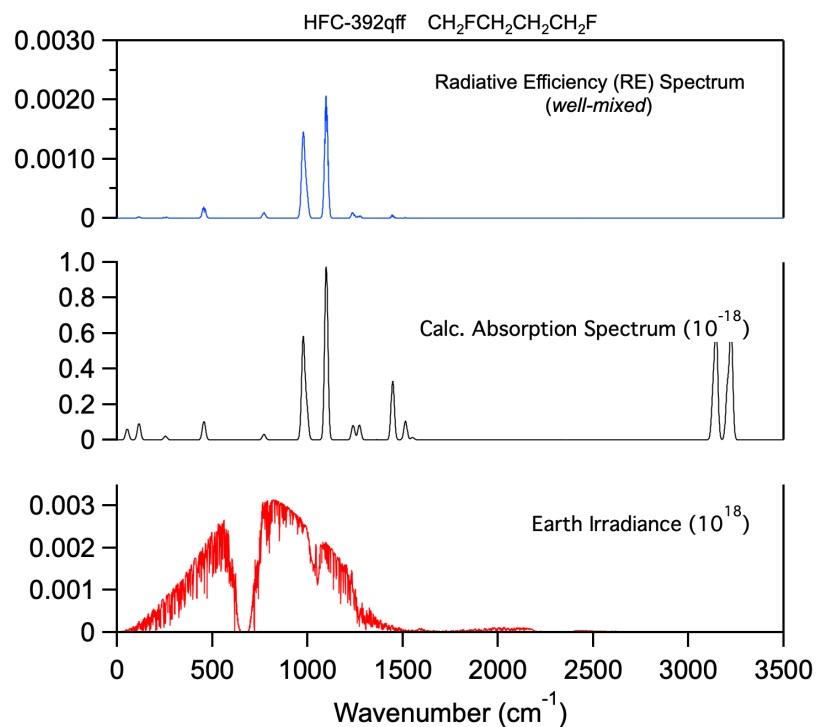
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
53	7.7
115	11.7
159	0
254	2.6
290	0
456	13.3
549	0
771	3.9
863	0
906	0
977	73
996	21.9
1098	125.1
1101	0.3
1146	0
1188	0
1239	10.5
1272	10.6
1301	0
1349	0
1364	0.2
1444	0.1
1447	42.3
1467	0
1506	0
1514	13.5
1551	1.7
1552	0
3124	0
3129	30.4
3145	60.4
3146	21.9
3187	0
3204	36.4
3223	9.5
3224	71.4

Radiative Efficiency Spectrum



HFC-392scf

Molecular Formula: CH₃-CH₂-CF₂-CH₃
 CAS RN: 353-81-1
 Molecular Weight: 94.10

Global Atmospheric Lifetime (years): 0.78
 Tropospheric Atmospheric Lifetime (years): 0.80
 Stratospheric Atmospheric Lifetime (years): 26

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.105	0.080
Global Warming Potential (GWP _H):		
GWP ₂₀		150
GWP ₁₀₀		41
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		47
GTP ₅₀		7
GTP ₁₀₀		6

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 6.12 \times 10^{-14}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 4.66 \times 10^{-14}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.78 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.80 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 27.7 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 8.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 462 \text{ years}$$

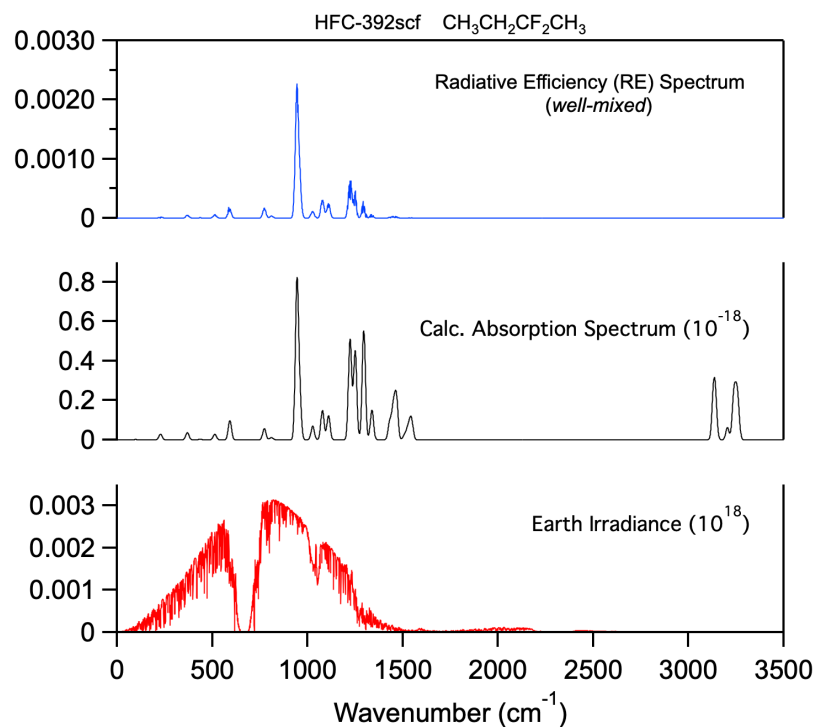
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
97	0.2
218	0
222	0.1
228	3.5
356	0
369	4.6
436	0.4
513	3.6
592	12.4
773	7.3
810	1.5
944	100.5
959	23.9
1027	8.8
1078	19.1
1110	15.8
1223	65.4
1250	57.5
1295	71
1338	19.4
1431	11.4
1450	20.7
1466	27.6
1508	2.8
1523	2.5
1524	2.2
1534	6.7
1546	11.9
3131	26.9
3138	2.5
3142	19.9
3204	8
3236	21.1
3246	17.5
3256	15
3261	10.7

Radiative Efficiency Spectrum



HFC-392see

Molecular Formula: CH₃-CHF-CHF-CH₃
 CAS RN: 666-21-7
 Molecular Weight: 94.10

Global Atmospheric Lifetime (years): 0.28
 Tropospheric Atmospheric Lifetime (years): 0.28
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.086	0.045
Global Warming Potential (GWP _H):		
GWP ₂₀		30
GWP ₁₀₀		8
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		9
GTP ₅₀		1
GTP ₁₀₀		1

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 1.67 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 1.32 \times 10^{-13}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.28 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.28 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 8.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 462 \text{ years}$$

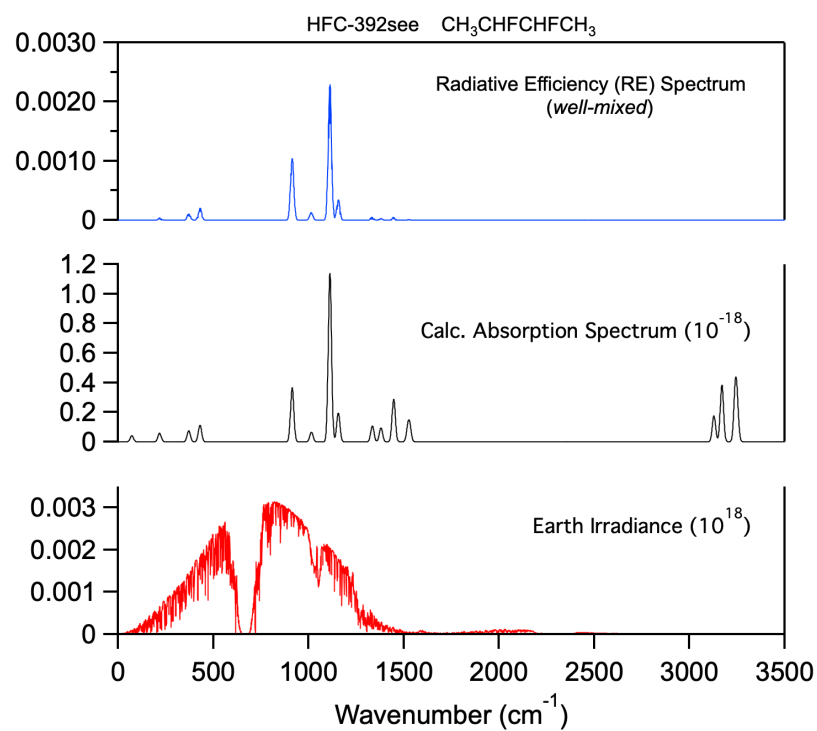
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
72	5.3
217	7.2
221	0.1
227	0.4
329	0
371	9.5
430	14.5
462	0
542	0
851	0
914	46.8
958	0
1015	8.3
1112	146.3
1129	0
1156	24.8
1200	0
1245	0
1335	13.8
1380	11.9
1389	0
1441	0.1
1447	36.8
1479	0
1522	10.7
1525	0
1531	11.3
1536	0
3127	14.4
3130	8.3
3158	0
3170	49.5
3239	14.2
3242	30.9
3249	8.2
3252	11.5

Radiative Efficiency Spectrum



HFC-3-10-1q

Molecular Formula: CH₃-CH₂-CH₂-CH₂F
 CAS RN: 2366-52-1
 Molecular Weight: 76.11

Global Atmospheric Lifetime (years): 0.08
 Tropospheric Atmospheric Lifetime (years): 0.08
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.046	0.011
Global Warming Potential (GWP _H):		
GWP ₂₀		3
GWP ₁₀₀		1
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		1
GTP ₅₀		0
GTP ₁₀₀		0

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 5.60 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 4.62 \times 10^{-13}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.08 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.08 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 9.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 411 \text{ years}$$

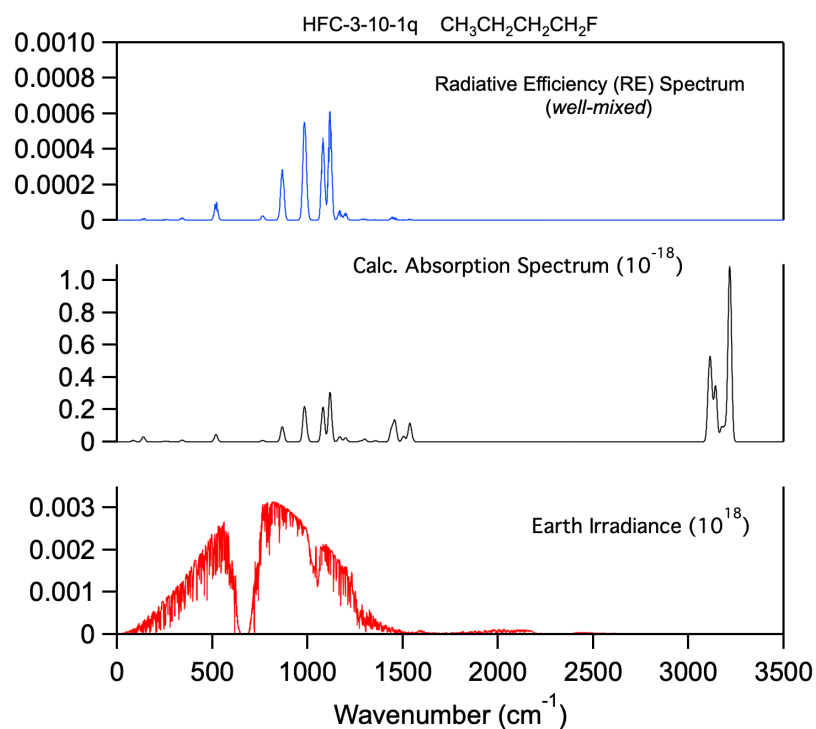
$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
85	1.1
138	3.9
249	0.4
262	0.4
342	1.3
519	5.9
764	1.1
863	3.6
869	9
983	26.1
995	5.1
1081	27.7
1118	39.4
1169	4.1
1199	3.2
1278	0.7
1300	2.1
1351	0.4
1360	0.5
1440	8.8
1449	2.2
1459	15.3
1504	4.4
1528	1.1
1536	8.1
1539	6
1550	0.8
3107	24.8
3110	22.1
3119	35.8
3142	43.7
3173	10.7
3191	9.8
3213	58.5
3218	21.8
3219	67.3

Radiative Efficiency Spectrum



HFC-3-10-1se

Molecular Formula: CH₃-CH₂-CHF-CH₃
 CAS RN: 359-01-3
 Molecular Weight: 76.11

Global Atmospheric Lifetime (years): 0.10
 Tropospheric Atmospheric Lifetime (years): 0.10
 Stratospheric Atmospheric Lifetime (years): 25

	<i>Well-mixed</i>	<i>Lifetime and Stratosphere adjusted</i>
Radiative Efficiency (RE):	0.048	0.014
Global Warming Potential (GWP _H):		
GWP ₂₀		4
GWP ₁₀₀		1
Global Temperature Change Potentials (GTP _H):		
GTP ₂₀		1
GTP ₅₀		0
GTP ₁₀₀		0

* RE units: W m² ppb⁻¹
 * GWP and GTP: Relative to CO₂

Atmospheric Loss Processes *****

OH Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Rec}}(T) = NA$$

$$k_{\text{SAR}}(298 \text{ K}) = 4.39 \times 10^{-13}$$

$$k_{\text{SAR}}(272 \text{ K}) \approx 3.60 \times 10^{-13}$$

$$\tau_{\text{Global}}^{\text{OH}} = 0.10 \text{ years}$$

$$\tau_{\text{Trop}}^{\text{OH}} = 0.10 \text{ years}$$

$$\tau_{\text{Strat}}^{\text{OH}} = 25 \text{ years}$$

O(¹D) Reactivity (cm³ molecule⁻¹ s⁻¹)

$$k_{\text{Est}}(T) = 9.0 \times 10^{-11}$$

$$\tau_{\text{O}(\text{1D})} = 411 \text{ years}$$

$$k_{\text{Rec}}(T) = NA$$



Calculated Infrared Spectrum

Band Center (cm ⁻¹)	Band Strength (km mole ⁻¹)
107	0.6
221	1.4
229	0
247	0.6
370	3.1
463	4.1
499	3
788	3.3
849	7.7
934	35.8
1002	7.6
1025	16.6
1087	14.9
1169	23.9
1182	10.6
1227	6.9
1320	1.1
1354	2.2
1400	11.9
1440	8.8
1448	12.8
1464	10
1505	1.5
1521	4.9
1533	0.1
1534	11.6
1542	7.3
3116	33.5
3119	7.4
3124	25.3
3143	31.1
3185	16.3
3218	38.8
3231	21.9
3236	29.4
3241	24.2

Radiative Efficiency Spectrum

