HFC-23

Molecular Formula: CHF_3
CAS RN: 75-46-7
Molecular Weight: 70.01

Global Atmospheric Lifetime (years): 7.77 (*228*)
Tropospheric Atmospheric Lifetime (years): 8.07 (*243*)
Stratospheric Atmospheric Lifetime (years): 190.6 (*4420*)

	Well-mixed	*Lifetime and Stratosphere adjusted*
Radiative Efficiency (RE):	0.195	0.202 (*0.18*)
Global Warming Potential (GWP_H):		
GWP_{20}		4699 (*11085*)
GWP_{100}		1384 (*12690*)
Global Temperature Change Potentials (GTP_H)		
GTP_{20}		3182 (*11825*)
GTP_{50}		399 (*13340*)
GTP_{100}		195 (*13150*)

* RE units: W m^2 ppb^{-1}
* GWP and GTP: Relative to CO_2
* Italic values in () taken from WMO-2018

Atmospheric Loss Processes **********

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

$k_{SAR}(298\ K) = 6.81 \times 10^{-15}$

$k_{SAR}(272\ K) \approx 4.64 \times 10^{-15}$

$k_{Rec}(T) = 6.1 \times 10^{-13} \exp(-2260/T)$

$k_{Rec}(298\ K) = 3.1 \times 10^{-16}$

$k_{Rec}(272\ K) = 1.5 \times 10^{-16}$

$\tau^{OH}_{Global} = 7.79$ years

$\tau^{OH}_{Trop} = 8.07$ years

$\tau^{OH}_{Strat} = 221.4$ years

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

$k_{Est}(T) = 7.2 \times 10^{-12}$

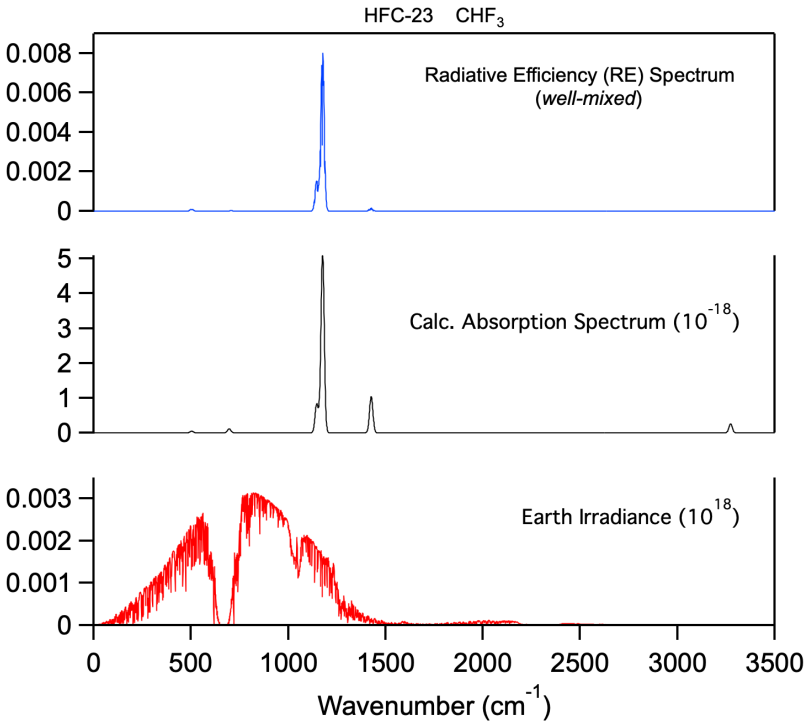
$k_{Rec}(T) = 0.25 \times 8.7 \times 10^{-12} \exp(30/T)$

$\tau_{O(^1D)} = 1370$ years

Calculated Infrared Spectrum

Band Center (cm^{-1})	Band Strength (km $mole^{-1}$)
503	2.9
503	2.9
696	14.6
1146	106.6
1176	326.5
1176	326.5
1426	67.1
1426	67.1
3273	33.4

Radiative Efficiency Spectrum



HFC-32

Molecular Formula: CH_2F_2
CAS RN: 75-10-5
Molecular Weight: 52.02

Global Atmospheric Lifetime (years): 7.23 (*5.4*)
Tropospheric Atmospheric Lifetime (years): 7.54 (*5.5*)
Stratospheric Atmospheric Lifetime (years): 173.4 (*124*)

	Well-mixed	*Lifetime and Stratosphere adjusted*
Radiative Efficiency (RE):	0.130	0.135 (*0.11*)
Global Warming Potential (GWP_H):		
GWP_{20}		3963 (*2530*)
GWP_{100}		1151 (*705*)
Global Temperature Change Potentials (GTP_H)		
GTP_{20}		2599 (*1440*)
GTP_{50}		309 (*154*)
GTP_{100}		161 (*98*)

* RE units: W m^2 ppb^{-1}
* GWP and GTP: Relative to CO_2
* Italic values in () taken from WMO-2018

Atmospheric Loss Processes **********

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

$k_{SAR}(298\ K) = 7.26 \times 10^{-15}$

$k_{SAR}(272\ K) \approx 4.96 \times 10^{-15}$

$k_{Rec}(T) = 1.7 \times 10^{-12} \exp(-1500/T)$

$k_{Rec}(298\ K) = 1.1 \times 10^{-14}$

$k_{Rec}(272\ K) = 6.85 \times 10^{-15}$

$\tau^{OH}_{Global} = 7.28$ years
$\tau^{OH}_{Trop} = 7.54$ years
$\tau^{OH}_{Strat} = 208.3$ years

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

$k_{Est}(T) = 3.6 \times 10^{-11}$

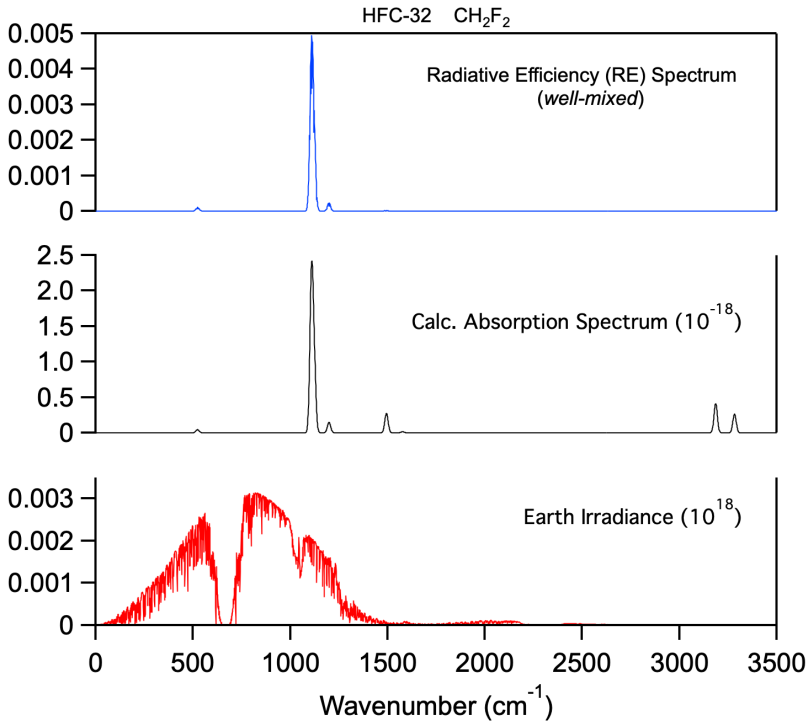
$k_{Rec}(T) = 0.30 \times 5.1 \times 10^{-11}$

$\tau_{O(^1D)} = 1036$ years

Calculated Infrared Spectrum

Band Center (cm^{-1})	Band Strength (km $mole^{-1}$)
523	5.6
1109	278.1
1123	109.4
1199	18.8
1295	0
1494	35.1
1577	1.9
3186	52.8
3283	33.9

Radiative Efficiency Spectrum



HFC-41

Molecular Formula: CH_3F
CAS RN: 593-53-3
Molecular Weight: 34.03

Global Atmospheric Lifetime (years): 2.85 (*2.8*)
Tropospheric Atmospheric Lifetime (years): 2.95 (*2.9*)
Stratospheric Atmospheric Lifetime (years): 83.9 (*65*)

	Well-mixed	*Lifetime and Stratosphere adjusted*
Radiative Efficiency (RE):	0.0358	0.0346 (*0.02*)
Global Warming Potential (GWP_H):		
GWP_{20}		655 (*430*)
GWP_{100}		178 (*116*)
Global Temperature Change Potentials (GTP_H)		
GTP_{20}		272 (*177*)
GTP_{50}		33 (*21*)
GTP_{100}		25 (*16*)

* RE units: W m^2 ppb^{-1}
* GWP and GTP: Relative to CO_2
* Italic values in () taken from WMO-2018

Atmospheric Loss Processes **********

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

$k_{SAR}(298\ K) = 1.77 \times 10^{-14}$

$k_{SAR}(272\ K) \approx 1.27 \times 10^{-14}$

$k_{Rec}(T) = 2.2 \times 10^{-12} \exp(-1400/T)$

$k_{Rec}(298\ K) = 2.0 \times 10^{-14}$

$k_{Rec}(272\ K) = 1.28 \times 10^{-14}$

$\tau^{OH}_{Global} = 2.86$ years
$\tau^{OH}_{Trop} = 2.95$ years
$\tau^{OH}_{Strat} = 89.4$ years

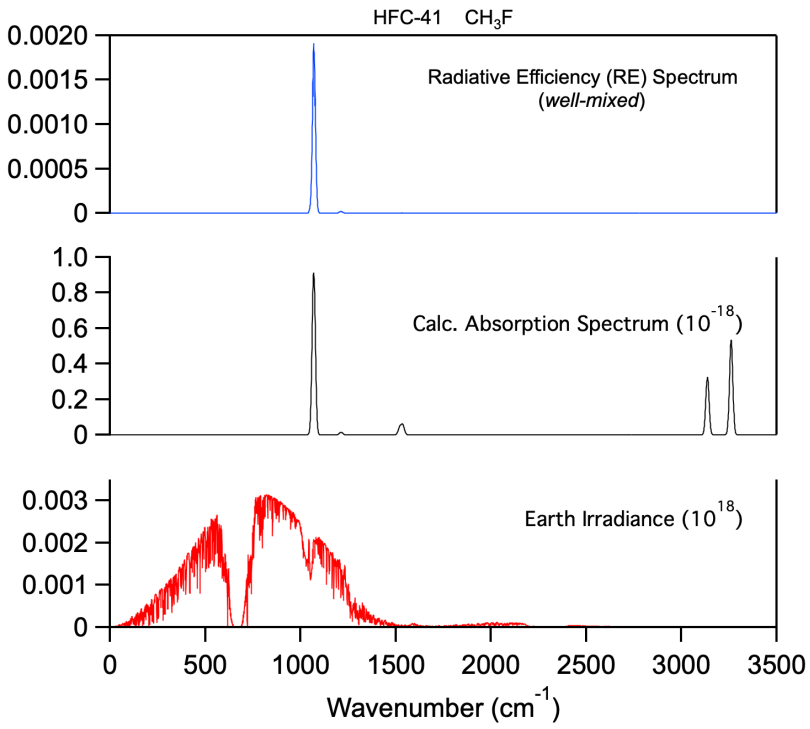
O(^{1}D) Reactivity (cm^3 $molecule^{-1}$ s^{-1})

$k_{Est}(T) = 2.7 \times 10^{-11}$

$k_{Rec}(T) = 0.82 \times 1.5 \times 10^{-10}$

$\tau_{O(^1D)} = 1370$ years

Calculated Infrared Spectrum

Band Center (cm^{-1})	Band Strength (km $mole^{-1}$)
1069	117.2
1212	0.9
1213	0.9
1521	5.3
1537	3.3
1537	3.3
3136	41.5
3260	34.3
3261	34.4

Radiative Efficiency Spectrum