

Number	Reaction	$A$	$n$	$E$	Ref.	
1f	$\text{H} + \text{O}_2 \rightleftharpoons \text{OH} + \text{O}$	3.520E+16	-0.70	71.4	[1]	
2f	$\text{H}_2 + \text{O} \rightleftharpoons \text{OH} + \text{H}$	5.060E+04	2.67	26.3	[1]	
3f	$\text{H}_2 + \text{OH} \rightleftharpoons \text{H}_2\text{O} + \text{H}$	1.170E+09	1.30	15.2	[1]	
4f	$\text{H}_2\text{O} + \text{O} \rightleftharpoons 2 \text{OH}$	7.600E+00	3.84	53.5	[1]	
5f <sup>a</sup>	$2 \text{H} + \text{M}^{(1)} \rightleftharpoons \text{H}_2 + \text{M}^{(1)}$	1.300E+18	-1.00	0	[2]	
6f <sup>a</sup>	$\text{H} + \text{OH} + \text{M}^{(2)} \rightleftharpoons \text{H}_2\text{O} + \text{M}^{(2)}$	4.000E+22	-2.00	0	[2]	
7f <sup>a</sup>	$2 \text{O} + \text{M}^{(3)} \rightleftharpoons \text{O}_2 + \text{M}^{(3)}$	6.170E+15	-0.50	0	[2]	
8f <sup>a</sup>	$\text{H} + \text{O} + \text{M}^{(4)} \rightleftharpoons \text{OH} + \text{M}^{(4)}$	4.710E+18	-1.00	0	[2]	
9f <sup>a</sup>	$\text{O} + \text{OH} + \text{M}^{(4)} \rightleftharpoons \text{HO}_2 + \text{M}^{(4)}$	8.000E+15	0.00	0	[2]	
10f <sup>a,b</sup>	$\text{H} + \text{O}_2 + \text{M}^{(5)} \rightleftharpoons \text{HO}_2 + \text{M}^{(5)}$	$k_0$	5.750E+19	-1.40	0	[3, 2]
		$k_\infty$	4.650E+12	0.44	0	
11f	$\text{HO}_2 + \text{H} \rightleftharpoons 2 \text{OH}$	7.080E+13	0.00	1.23	[4]	
12f	$\text{HO}_2 + \text{H} \rightleftharpoons \text{H}_2 + \text{O}_2$	1.660E+13	0.00	3.44	[4]	
13f	$\text{HO}_2 + \text{H} \rightleftharpoons \text{H}_2\text{O} + \text{O}$	3.100E+13	0.00	7.2	[1]	
14f	$\text{HO}_2 + \text{O} \rightleftharpoons \text{OH} + \text{O}_2$	2.000E+13	0.00	0	[5]	
15f	$\text{HO}_2 + \text{OH} \rightleftharpoons \text{H}_2\text{O} + \text{O}_2$	2.890E+13	0.00	-2.08	[1]	
16f <sup>a,b</sup>	$2 \text{OH} + \text{M}^{(6)} \rightleftharpoons \text{H}_2\text{O}_2 + \text{M}^{(6)}$	$k_0$	2.300E+18	-0.90	-7.12	[1]
		$k_\infty$	7.400E+13	-0.37	0	
17f	$2 \text{HO}_2 \rightleftharpoons \text{H}_2\text{O}_2 + \text{O}_2$	3.020E+12	0.00	5.8	[1]	
18f	$\text{H}_2\text{O}_2 + \text{H} \rightleftharpoons \text{HO}_2 + \text{H}_2$	4.790E+13	0.00	33.3	[6]	
19f	$\text{H}_2\text{O}_2 + \text{H} \rightleftharpoons \text{H}_2\text{O} + \text{OH}$	1.000E+13	0.00	15	[6]	
20f	$\text{H}_2\text{O}_2 + \text{OH} \rightleftharpoons \text{H}_2\text{O} + \text{HO}_2$	7.080E+12	0.00	6	[1]	
21f	$\text{H}_2\text{O}_2 + \text{O} \rightleftharpoons \text{HO}_2 + \text{OH}$	9.630E+06	2.00	16.7	[1]	
22f	$\text{CO} + \text{OH} \rightleftharpoons \text{CO}_2 + \text{H}$	4.400E+06	1.50	-3.1	[1]	
23f	$\text{CO} + \text{HO}_2 \rightleftharpoons \text{CO}_2 + \text{OH}$	6.000E+13	0.00	96	[1]	
24f	$\text{CO} + \text{O}_2 \rightleftharpoons \text{CO}_2 + \text{O}$	1.000E+12	0.00	200	[2]	
25f <sup>a</sup>	$\text{HCO} + \text{M}^{(7)} \rightleftharpoons \text{CO} + \text{H} + \text{M}^{(7)}$	1.860E+17	-1.00	71.1	[7]	
26f	$\text{HCO} + \text{H} \rightleftharpoons \text{CO} + \text{H}_2$	5.000E+13	0.00	0	[8]	
27f	$\text{HCO} + \text{O} \rightleftharpoons \text{CO} + \text{OH}$	3.000E+13	0.00	0	[1]	
28f	$\text{HCO} + \text{O} \rightleftharpoons \text{CO}_2 + \text{H}$	3.000E+13	0.00	0	[1]	
29f	$\text{HCO} + \text{OH} \rightleftharpoons \text{CO} + \text{H}_2\text{O}$	3.000E+13	0.00	0	[9]	
30f	$\text{HCO} + \text{O}_2 \rightleftharpoons \text{CO} + \text{HO}_2$	7.580E+12	0.00	1.72	[10]	
31f	$\text{HCO} + \text{CH}_3 \rightleftharpoons \text{CO} + \text{CH}_4$	5.000E+13	0.00	0	[8]	
32f <sup>a,b</sup>	$\text{H} + \text{HCO} + \text{M}^{(8)} \rightleftharpoons \text{CH}_2\text{O} + \text{M}^{(8)}$	$k_0$	1.350E+24	-2.57	1.78	[11]
		$k_\infty$	1.090E+12	0.48	-1.09	
33f	$\text{CH}_2\text{O} + \text{H} \rightleftharpoons \text{HCO} + \text{H}_2$	5.740E+07	1.90	11.5	[12]	

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34f	$\text{CH}_2\text{O} + \text{O} \rightleftharpoons \text{HCO} + \text{OH}$	3.500E+13	0.00	14.7	[1]	
35f	$\text{CH}_2\text{O} + \text{OH} \rightleftharpoons \text{HCO} + \text{H}_2\text{O}$	3.900E+10	0.89	1.7	[1]	
36f	$\text{CH}_2\text{O} + \text{O}_2 \rightleftharpoons \text{HCO} + \text{HO}_2$	6.000E+13	0.00	170	[13]	
37f	$\text{CH}_2\text{O} + \text{HO}_2 \rightleftharpoons \text{HCO} + \text{H}_2\text{O}_2$	4.110E+04	2.50	42.7	[14]	
38f	$\text{CH}_4 + \text{H} \rightleftharpoons \text{H}_2 + \text{CH}_3$	1.300E+04	3.00	33.6	[15]	
39f	$\text{CH}_4 + \text{OH} \rightleftharpoons \text{H}_2\text{O} + \text{CH}_3$	1.600E+07	1.83	11.6	[15]	
40f	$\text{CH}_4 + \text{O} \rightleftharpoons \text{CH}_3 + \text{OH}$	1.900E+09	1.44	36.3	[16]	
41f	$\text{CH}_4 + \text{O}_2 \rightleftharpoons \text{CH}_3 + \text{HO}_2$	3.980E+13	0.00	238	[7, 17]	
42f	$\text{CH}_4 + \text{HO}_2 \rightleftharpoons \text{CH}_3 + \text{H}_2\text{O}_2$	9.030E+12	0.00	103	[7, 17]	
43f	$\text{CH}_3 + \text{H} \rightleftharpoons \text{T-CH}_2 + \text{H}_2$	1.800E+14	0.00	63.2	[16]	
44f	$\text{CH}_3 + \text{H} \rightleftharpoons \text{S-CH}_2 + \text{H}_2$	1.550E+14	0.00	56.4	[16]	
45f	$\text{CH}_3 + \text{OH} \rightleftharpoons \text{S-CH}_2 + \text{H}_2\text{O}$	4.000E+13	0.00	10.5	[18, 8]	
46f	$\text{CH}_3 + \text{O} \rightleftharpoons \text{CH}_2\text{O} + \text{H}$	8.430E+13	0.00	0	[16]	
47f	$\text{CH}_3 + \text{T-CH}_2 \rightleftharpoons \text{C}_2\text{H}_4 + \text{H}$	4.220E+13	0.00	0	[13]	
48f	$\text{CH}_3 + \text{HO}_2 \rightleftharpoons \text{CH}_3\text{O} + \text{OH}$	5.000E+12	0.00	0	[13]	
49f	$\text{CH}_3 + \text{O}_2 \rightleftharpoons \text{CH}_2\text{O} + \text{OH}$	3.300E+11	0.00	37.4	[19]	
50f	$\text{CH}_3 + \text{O}_2 \rightleftharpoons \text{CH}_3\text{O} + \text{O}$	1.100E+13	0.00	116	[19]	
51f	$2 \text{CH}_3 \rightleftharpoons \text{C}_2\text{H}_4 + \text{H}_2$	1.000E+14	0.00	134	[20]	
52f	$2 \text{CH}_3 \rightleftharpoons \text{C}_2\text{H}_5 + \text{H}$	3.160E+13	0.00	61.5	[21]	
53f <sup>a,b</sup>	$\text{H} + \text{CH}_3 + \text{M}^{(9)} \rightleftharpoons \text{CH}_4 + \text{M}^{(9)}$	$k_0$	2.470E+33	-4.76	10.2	[22]
		$k_\infty$	1.270E+16	-0.63	1.6	
54f <sup>a,b</sup>	$2 \text{CH}_3 + \text{M}^{(8)} \rightleftharpoons \text{C}_2\text{H}_6 + \text{M}^{(8)}$	$k_0$	1.270E+41	-7.00	11.6	[15]
		$k_\infty$	1.810E+13	0.00	0	
55f	$\text{S-CH}_2 + \text{OH} \rightleftharpoons \text{CH}_2\text{O} + \text{H}$	3.000E+13	0.00	0	[16]	
56f	$\text{S-CH}_2 + \text{O}_2 \rightleftharpoons \text{CO} + \text{OH} + \text{H}$	3.130E+13	0.00	0	[16]	
57f	$\text{S-CH}_2 + \text{CO}_2 \rightleftharpoons \text{CO} + \text{CH}_2\text{O}$	3.000E+12	0.00	0	[23]	
58f <sup>a</sup>	$\text{S-CH}_2 + \text{M}^{(10)} \rightleftharpoons \text{T-CH}_2 + \text{M}^{(10)}$	6.000E+12	0.00	0	[16]	
59f	$\text{T-CH}_2 + \text{H} \rightleftharpoons \text{CH} + \text{H}_2$	6.020E+12	0.00	-7.48	[13]	
60f	$\text{T-CH}_2 + \text{OH} \rightleftharpoons \text{CH}_2\text{O} + \text{H}$	2.500E+13	0.00	0	[16]	
61f	$\text{T-CH}_2 + \text{OH} \rightleftharpoons \text{CH} + \text{H}_2\text{O}$	1.130E+07	2.00	12.6	[16]	
62f	$\text{T-CH}_2 + \text{O} \rightleftharpoons \text{CO} + 2 \text{H}$	8.000E+13	0.00	0	[24]	
63f	$\text{T-CH}_2 + \text{O} \rightleftharpoons \text{CO} + \text{H}_2$	4.000E+13	0.00	0	[24]	
64f	$\text{T-CH}_2 + \text{O}_2 \rightleftharpoons \text{CO}_2 + \text{H}_2$	2.630E+12	0.00	6.24	[23]	
65f	$\text{T-CH}_2 + \text{O}_2 \rightleftharpoons \text{CO} + \text{OH} + \text{H}$	6.580E+12	0.00	6.24	[23]	
66f	$2 \text{T-CH}_2 \rightleftharpoons \text{C}_2\text{H}_2 + 2 \text{H}$	1.000E+14	0.00	0	[16]	
67f	$\text{CH} + \text{O} \rightleftharpoons \text{CO} + \text{H}$	4.000E+13	0.00	0	[25]	

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68f	$\text{CH} + \text{O}_2 \rightleftharpoons \text{HCO} + \text{O}$	1.770E+11	0.76	-2	[26]
69f	$\text{CH} + \text{H}_2\text{O} \rightleftharpoons \text{CH}_2\text{O} + \text{H}$	1.170E+15	-0.75	0	[23]
70f	$\text{CH} + \text{CO}_2 \rightleftharpoons \text{HCO} + \text{CO}$	4.800E+01	3.22	-13.5	[26]
71f	$\text{CH}_3\text{O} + \text{H} \rightleftharpoons \text{CH}_2\text{O} + \text{H}_2$	2.000E+13	0.00	0	[27]
72f	$\text{CH}_3\text{O} + \text{H} \rightleftharpoons \text{S-CH}_2 + \text{H}_2\text{O}$	1.600E+13	0.00	0	[27]
73f	$\text{CH}_3\text{O} + \text{OH} \rightleftharpoons \text{CH}_2\text{O} + \text{H}_2\text{O}$	5.000E+12	0.00	0	[27]
74f	$\text{CH}_3\text{O} + \text{O} \rightleftharpoons \text{OH} + \text{CH}_2\text{O}$	1.000E+13	0.00	0	[27]
75f	$\text{CH}_3\text{O} + \text{O}_2 \rightarrow \text{CH}_2\text{O} + \text{HO}_2$	4.280E-13	7.60	-14.8	[27]
76f <sup>a</sup>	$\text{CH}_3\text{O} + \text{M}^{(9)} \rightleftharpoons \text{CH}_2\text{O} + \text{H} + \text{M}^{(9)}$	7.780E+13	0.00	56.5	[8]
77f	$\text{C}_2\text{H}_6 + \text{H} \rightleftharpoons \text{C}_2\text{H}_5 + \text{H}_2$	5.400E+02	3.50	21.8	[16]
78f	$\text{C}_2\text{H}_6 + \text{O} \rightleftharpoons \text{C}_2\text{H}_5 + \text{OH}$	1.400E+00	4.30	11.6	[16]
79f	$\text{C}_2\text{H}_6 + \text{OH} \rightleftharpoons \text{C}_2\text{H}_5 + \text{H}_2\text{O}$	2.200E+07	1.90	4.7	[16]
80f	$\text{C}_2\text{H}_6 + \text{CH}_3 \rightleftharpoons \text{C}_2\text{H}_5 + \text{CH}_4$	5.500E-01	4.00	34.7	[16]
81f <sup>a,b</sup>	$\text{C}_2\text{H}_6 + \text{M}^{(8)} \rightleftharpoons \text{C}_2\text{H}_5 + \text{H} + \text{M}^{(8)}$	$k_0$ 4.900E+42 $k_\infty$ 8.850E+20	-6.43 -1.23	448 428	[15, 11, 8]
82f	$\text{C}_2\text{H}_6 + \text{HO}_2 \rightleftharpoons \text{C}_2\text{H}_5 + \text{H}_2\text{O}_2$	1.320E+13	0.00	85.6	[13, 8]
83f	$\text{C}_2\text{H}_5 + \text{H} \rightleftharpoons \text{C}_2\text{H}_4 + \text{H}_2$	3.000E+13	0.00	0	[16]
84f	$\text{C}_2\text{H}_5 + \text{O} \rightleftharpoons \text{C}_2\text{H}_4 + \text{OH}$	3.060E+13	0.00	0	[16]
85f	$\text{C}_2\text{H}_5 + \text{O} \rightleftharpoons \text{CH}_3 + \text{CH}_2\text{O}$	4.240E+13	0.00	0	[16]
86f	$\text{C}_2\text{H}_5 + \text{O}_2 \rightleftharpoons \text{C}_2\text{H}_4 + \text{HO}_2$	2.000E+12	0.00	20.9	[16]
87f <sup>a,b</sup>	$\text{C}_2\text{H}_5 + \text{M}^{(9)} \rightleftharpoons \text{C}_2\text{H}_4 + \text{H} + \text{M}^{(9)}$	$k_0$ 3.990E+33 $k_\infty$ 1.110E+10	-4.99 1.04	167 154	[28, 8]
88f	$\text{C}_2\text{H}_4 + \text{H} \rightleftharpoons \text{C}_2\text{H}_3 + \text{H}_2$	4.490E+07	2.12	55.9	[29]
89f	$\text{C}_2\text{H}_4 + \text{OH} \rightleftharpoons \text{C}_2\text{H}_3 + \text{H}_2\text{O}$	5.530E+05	2.31	12.4	[29]
90f	$\text{C}_2\text{H}_4 + \text{O} \rightleftharpoons \text{CH}_3 + \text{HCO}$	2.250E+06	2.08	0	[13]
91f	$\text{C}_2\text{H}_4 + \text{O} \rightleftharpoons \text{CH}_2\text{CHO} + \text{H}$	1.210E+06	2.08	0	[13]
92f	$2 \text{C}_2\text{H}_4 \rightleftharpoons \text{C}_2\text{H}_3 + \text{C}_2\text{H}_5$	5.010E+14	0.00	271	[30]
93f	$\text{C}_2\text{H}_4 + \text{O}_2 \rightleftharpoons \text{C}_2\text{H}_3 + \text{HO}_2$	4.220E+13	0.00	241	[31]
94f	$\text{C}_2\text{H}_4 + \text{HO}_2 \rightleftharpoons \text{C}_2\text{H}_4\text{O} + \text{OH}$	2.230E+12	0.00	71.9	[13]
95f	$\text{C}_2\text{H}_4\text{O} + \text{HO}_2 \rightleftharpoons \text{CH}_3 + \text{CO} + \text{H}_2\text{O}_2$	4.000E+12	0.00	71.2	[13]
96f <sup>a</sup>	$\text{C}_2\text{H}_4 + \text{M}^{(9)} \rightleftharpoons \text{C}_2\text{H}_3 + \text{H} + \text{M}^{(9)}$	2.600E+17	0.00	404	[32, 8]
97f <sup>a</sup>	$\text{C}_2\text{H}_4 + \text{M}^{(9)} \rightleftharpoons \text{C}_2\text{H}_2 + \text{H}_2 + \text{M}^{(9)}$	3.500E+16	0.00	299	[32, 8]
98f	$\text{C}_2\text{H}_3 + \text{H} \rightleftharpoons \text{C}_2\text{H}_2 + \text{H}_2$	4.000E+13	0.00	0	[8]
99f <sup>a,b</sup>	$\text{C}_2\text{H}_3 + \text{M}^{(9)} \rightleftharpoons \text{C}_2\text{H}_2 + \text{H} + \text{M}^{(9)}$	$k_0$ 1.510E+14 $k_\infty$ 6.380E+09	0.10 1.00	137 157	[33, 8]
100f	$\text{C}_2\text{H}_3 + \text{O}_2 \rightleftharpoons \text{CH}_2\text{O} + \text{HCO}$	1.700E+29	-5.31	27.2	[34]

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101f	$C_2H_3 + O_2 \rightleftharpoons CH_2CHO + O$	7.000E+14	-0.61	22	[33, 34]
102f	$C_2H_3 + O_2 \rightleftharpoons C_2H_2 + HO_2$	5.190E+15	-1.26	13.9	[33, 34]
103f	$C_2H_2 + O \rightleftharpoons HCCO + H$	4.000E+14	0.00	44.6	[24]
104f	$C_2H_2 + O \rightleftharpoons T-CH_2 + CO$	1.600E+14	0.00	41.4	[24]
105f	$C_2H_2 + O_2 \rightleftharpoons CH_2O + CO$	4.600E+15	-0.54	188	[35]
106f	$C_2H_2 + OH \rightleftharpoons CH_2CO + H$	1.900E+07	1.70	4.18	[7, 36]
107f	$C_2H_2 + OH \rightleftharpoons C_2H + H_2O$	3.370E+07	2.00	58.6	[7, 36]
108f	$CH_2CO + H \rightleftharpoons CH_3 + CO$	1.500E+09	1.43	11.2	[37]
109f	$CH_2CO + O \rightleftharpoons T-CH_2 + CO_2$	2.000E+13	0.00	9.6	[7, 36]
110f	$CH_2CO + O \rightleftharpoons HCCO + OH$	1.000E+13	0.00	8.37	[7, 36]
111f	$CH_2CO + CH_3 \rightleftharpoons C_2H_5 + CO$	9.000E+10	0.00	0	[7, 36]
112f	$HCCO + H \rightleftharpoons S-CH_2 + CO$	1.500E+14	0.00	0	[24]
113f	$HCCO + OH \rightleftharpoons HCO + CO + H$	2.000E+12	0.00	0	[38]
114f	$HCCO + O \rightleftharpoons 2 CO + H$	9.640E+13	0.00	0	[24]
115f	$HCCO + O_2 \rightleftharpoons 2 CO + OH$	2.880E+07	1.70	4.19	[33]
116f	$HCCO + O_2 \rightleftharpoons CO_2 + CO + H$	1.400E+07	1.70	4.19	[33]
117f	$C_2H + OH \rightleftharpoons HCCO + H$	2.000E+13	0.00	0	[16, 36]
118f	$C_2H + O \rightleftharpoons CO + CH$	1.020E+13	0.00	0	[16, 36]
119f	$C_2H + O_2 \rightleftharpoons HCCO + O$	6.020E+11	0.00	0	[16, 36]
120f	$C_2H + O_2 \rightleftharpoons CH + CO_2$	4.500E+15	0.00	105	[16, 36]
121f	$C_2H + O_2 \rightleftharpoons HCO + CO$	2.410E+12	0.00	0	[16, 36]
122f	$CH_2OH + H \rightleftharpoons CH_2O + H_2$	3.000E+13	0.00	0	[27]
123f	$CH_2OH + H \rightleftharpoons CH_3 + OH$	2.500E+17	-0.93	21.5	[8]
124f	$CH_2OH + OH \rightleftharpoons CH_2O + H_2O$	2.400E+13	0.00	0	[27]
125f	$CH_2OH + O_2 \rightleftharpoons CH_2O + HO_2$	5.000E+12	0.00	0	[27]
126f <sup>a</sup>	$CH_2OH + M^{(9)} \rightleftharpoons CH_2O + H + M^{(9)}$	5.000E+13	0.00	105	[27]
127f <sup>a</sup>	$CH_3O + M^{(9)} \rightleftharpoons CH_2OH + M^{(9)}$	1.000E+14	0.00	80	[27]
128f	$CH_2CO + OH \rightleftharpoons CH_2OH + CO$	1.020E+13	0.00	0	[27]
129f	$CH_3OH + OH \rightleftharpoons CH_2OH + H_2O$	1.440E+06	2.00	-3.51	[27]
130f	$CH_3OH + OH \rightleftharpoons CH_3O + H_2O$	4.400E+06	2.00	6.3	[8]
131f	$CH_3OH + H \rightleftharpoons CH_2OH + H_2$	1.354E+03	3.20	14.6	[39]
132f	$CH_3OH + H \rightleftharpoons CH_3O + H_2$	6.830E+01	3.40	30.3	[39]
133f	$CH_3OH + O \rightleftharpoons CH_2OH + OH$	1.000E+13	0.00	19.6	[27]
134f	$CH_3OH + HO_2 \rightleftharpoons CH_2OH + H_2O_2$	6.200E+12	0.00	81.1	[27]
135f	$CH_3OH + O_2 \rightleftharpoons CH_2OH + HO_2$	2.000E+13	0.00	188	[27]
136f <sup>a,b</sup>	$CH_3OH + M^{(9)} \rightleftharpoons CH_3 + OH + M^{(9)} \quad k_0$	2.950E+44	-7.35	399	[40, 8]

Number	Reaction	$A$	$n$	$E$	Ref.
		$k_\infty$ 1.900E+16	0.00	384	
137f	$\text{CH}_2\text{CHO} \rightleftharpoons \text{CH}_2\text{CO} + \text{H}$	1.047E+37	-7.19	186	[31]
138f	$\text{CH}_2\text{CHO} + \text{H} \rightleftharpoons \text{CH}_3 + \text{HCO}$	5.000E+13	0.00	0	[12]
139f	$\text{CH}_2\text{CHO} + \text{H} \rightleftharpoons \text{CH}_2\text{CO} + \text{H}_2$	2.000E+13	0.00	0	[12]
140f	$\text{CH}_2\text{CHO} + \text{O} \rightleftharpoons \text{CH}_2\text{O} + \text{HCO}$	1.000E+14	0.00	0	[12]
141f	$\text{CH}_2\text{CHO} + \text{OH} \rightleftharpoons \text{CH}_2\text{CO} + \text{H}_2\text{O}$	3.000E+13	0.00	0	[12]
142f	$\text{CH}_2\text{CHO} + \text{O}_2 \rightleftharpoons \text{CH}_2\text{O} + \text{CO} + \text{OH}$	3.000E+10	0.00	0	[12]
143f	$\text{CH}_2\text{CHO} + \text{CH}_3 \rightleftharpoons \text{C}_2\text{H}_5 + \text{CO} + \text{H}$	4.900E+14	-0.50	0	[12]
144f	$\text{CH}_2\text{CHO} + \text{HO}_2 \rightleftharpoons \text{CH}_2\text{O} + \text{HCO} + \text{OH}$	7.000E+12	0.00	0	[12]
145f	$\text{CH}_2\text{CHO} + \text{HO}_2 \rightleftharpoons \text{CH}_3\text{CHO} + \text{O}_2$	3.000E+12	0.00	0	[12]
146f	$\text{CH}_2\text{CHO} \rightleftharpoons \text{CH}_3 + \text{CO}$	1.170E+43	-9.80	183	[12]
147f	$\text{CH}_3\text{CHO} \rightleftharpoons \text{CH}_3 + \text{HCO}$	7.000E+15	0.00	342	[12]
148f <sup>a,b</sup>	$\text{CH}_3\text{CO} + \text{M}^{(9)} \rightleftharpoons \text{CH}_3 + \text{CO} + \text{M}^{(9)}$	$k_0$ 1.200E+15 $k_\infty$ 3.000E+12	0.00 0.00	52.3 69.9	[12]
149f	$\text{CH}_3\text{CHO} + \text{OH} \rightleftharpoons \text{CH}_3\text{CO} + \text{H}_2\text{O}$	3.370E+12	0.00	-2.59	[12]
150f	$\text{CH}_3\text{CHO} + \text{OH} \rightleftharpoons \text{CH}_2\text{CHO} + \text{H}_2\text{O}$	3.370E+11	0.00	-2.59	[12]
151f	$\text{CH}_3\text{CHO} + \text{O} \rightleftharpoons \text{CH}_3\text{CO} + \text{OH}$	1.770E+18	-1.90	12.5	[12]
152f	$\text{CH}_3\text{CHO} + \text{O} \rightleftharpoons \text{CH}_2\text{CHO} + \text{OH}$	3.720E+13	-0.20	14.9	[12]
153f	$\text{CH}_3\text{CHO} + \text{H} \rightleftharpoons \text{CH}_3\text{CO} + \text{H}_2$	4.660E+13	-0.30	12.5	[12]
154f	$\text{CH}_3\text{CHO} + \text{H} \rightleftharpoons \text{CH}_2\text{CHO} + \text{H}_2$	1.850E+12	0.40	22.4	[12]
155f	$\text{CH}_3\text{CHO} + \text{CH}_3 \rightleftharpoons \text{CH}_3\text{CO} + \text{CH}_4$	3.900E-07	5.80	9.21	[12]
156f	$\text{CH}_3\text{CHO} + \text{CH}_3 \rightleftharpoons \text{CH}_2\text{CHO} + \text{CH}_4$	2.450E+01	3.10	24	[12]
157f	$\text{CH}_3\text{CHO} + \text{HO}_2 \rightleftharpoons \text{CH}_3\text{CO} + \text{H}_2\text{O}_2$	3.600E+19	-2.20	58.6	[12]
158f	$\text{CH}_3\text{CHO} + \text{HO}_2 \rightleftharpoons \text{CH}_2\text{CHO} + \text{H}_2\text{O}_2$	2.320E+11	0.40	62.3	[12]
159f	$\text{CH}_3\text{CHO} + \text{O}_2 \rightleftharpoons \text{CH}_3\text{CO} + \text{HO}_2$	1.000E+14	0.00	177	[12]
160f <sup>a,b</sup>	$\text{C}_2\text{H}_5\text{OH} + \text{M}^{(9)} \rightleftharpoons \text{CH}_3 + \text{CH}_2\text{OH} + \text{M}^{(9)}$	$k_0$ 3.000E+16 $k_\infty$ 5.000E+15	0.00 0.00	243 343	[8]
161f <sup>a,b</sup>	$\text{C}_2\text{H}_5\text{OH} + \text{M}^{(9)} \rightleftharpoons \text{C}_2\text{H}_4 + \text{H}_2\text{O} + \text{M}^{(9)}$	$k_0$ 1.000E+17 $k_\infty$ 8.000E+13	0.00 0.00	226 272	[8]
162f	$\text{C}_2\text{H}_5\text{OH} + \text{OH} \rightleftharpoons \text{CH}_2\text{CH}_2\text{OH} + \text{H}_2\text{O}$	1.810E+11	0.40	3	[12]
163f	$\text{C}_2\text{H}_5\text{OH} + \text{OH} \rightleftharpoons \text{CH}_3\text{CHOH} + \text{H}_2\text{O}$	3.090E+10	0.50	-1.59	[12]
164f	$\text{C}_2\text{H}_5\text{OH} + \text{OH} \rightleftharpoons \text{CH}_3\text{CH}_2\text{O} + \text{H}_2\text{O}$	1.050E+10	0.80	3	[12]
165f	$\text{C}_2\text{H}_5\text{OH} + \text{H} \rightleftharpoons \text{CH}_2\text{CH}_2\text{OH} + \text{H}_2$	1.900E+07	1.80	21.3	[12]
166f	$\text{C}_2\text{H}_5\text{OH} + \text{H} \rightleftharpoons \text{CH}_3\text{CHOH} + \text{H}_2$	2.580E+07	1.60	11.8	[12]
167f	$\text{C}_2\text{H}_5\text{OH} + \text{H} \rightleftharpoons \text{CH}_3\text{CH}_2\text{O} + \text{H}_2$	1.500E+07	1.60	12.7	[12]
168f	$\text{C}_2\text{H}_5\text{OH} + \text{O} \rightleftharpoons \text{CH}_2\text{CH}_2\text{OH} + \text{OH}$	9.410E+07	1.70	22.8	[12]

Number	Reaction	$A$	$n$	$E$	Ref.
169f	$\text{C}_2\text{H}_5\text{OH} + \text{O} \rightleftharpoons \text{CH}_3\text{CHOH} + \text{OH}$	1.880E+07	1.90	7.62	[12]
170f	$\text{C}_2\text{H}_5\text{OH} + \text{O} \rightleftharpoons \text{CH}_3\text{CH}_2\text{O} + \text{OH}$	1.580E+07	2.00	18.6	[12]
171f	$\text{C}_2\text{H}_5\text{OH} + \text{CH}_3 \rightleftharpoons \text{CH}_2\text{CH}_2\text{OH} + \text{CH}_4$	2.190E+02	3.20	40.2	[12]
172f	$\text{C}_2\text{H}_5\text{OH} + \text{CH}_3 \rightleftharpoons \text{CH}_3\text{CHOH} + \text{CH}_4$	7.280E+02	3.00	33.3	[12]
173f	$\text{C}_2\text{H}_5\text{OH} + \text{CH}_3 \rightleftharpoons \text{CH}_3\text{CH}_2\text{O} + \text{CH}_4$	1.450E+02	3.00	32	[12]
174f	$\text{C}_2\text{H}_5\text{OH} + \text{HO}_2 \rightleftharpoons \text{CH}_3\text{CHOH} + \text{H}_2\text{O}_2$	8.200E+03	2.50	45.2	[12]
175f	$\text{C}_2\text{H}_5\text{OH} + \text{HO}_2 \rightleftharpoons \text{CH}_2\text{CH}_2\text{OH} + \text{H}_2\text{O}_2$	2.430E+04	2.50	66.1	[12]
176f	$\text{C}_2\text{H}_5\text{OH} + \text{HO}_2 \rightleftharpoons \text{CH}_3\text{CH}_2\text{O} + \text{H}_2\text{O}_2$	3.800E+12	0.00	100	[12]
177f	$\text{C}_2\text{H}_4 + \text{OH} \rightleftharpoons \text{CH}_2\text{CH}_2\text{OH}$	2.410E+11	0.00	-9.96	[12]
178f	$\text{C}_2\text{H}_5 + \text{HO}_2 \rightleftharpoons \text{CH}_3\text{CH}_2\text{O} + \text{OH}$	4.000E+13	0.00	0	[12]
179f <sup>a</sup>	$\text{CH}_3\text{CH}_2\text{O} + \text{M}^{(9)} \rightleftharpoons \text{CH}_3\text{CHO} + \text{H} + \text{M}^{(9)}$	5.600E+34	-5.90	106	[12]
180f <sup>a</sup>	$\text{CH}_3\text{CH}_2\text{O} + \text{M}^{(9)} \rightleftharpoons \text{CH}_3 + \text{CH}_2\text{O} + \text{M}^{(9)}$	5.350E+37	-7.00	99.6	[12]
181f	$\text{CH}_3\text{CH}_2\text{O} + \text{O}_2 \rightleftharpoons \text{CH}_3\text{CHO} + \text{HO}_2$	4.000E+10	0.00	4.6	[12]
182f	$\text{CH}_3\text{CH}_2\text{O} + \text{CO} \rightleftharpoons \text{C}_2\text{H}_5 + \text{CO}_2$	4.680E+02	3.20	22.5	[12]
183f	$\text{CH}_3\text{CH}_2\text{O} + \text{H} \rightleftharpoons \text{CH}_3 + \text{CH}_2\text{OH}$	3.000E+13	0.00	0	[12]
184f	$\text{CH}_3\text{CH}_2\text{O} + \text{H} \rightleftharpoons \text{C}_2\text{H}_4 + \text{H}_2\text{O}$	3.000E+13	0.00	0	[12]
185f	$\text{CH}_3\text{CH}_2\text{O} + \text{OH} \rightleftharpoons \text{CH}_3\text{CHO} + \text{H}_2\text{O}$	1.000E+13	0.00	0	[12]
186f	$\text{CH}_3\text{CHOH} + \text{O}_2 \rightleftharpoons \text{CH}_3\text{CHO} + \text{HO}_2$	4.820E+13	0.00	21	[12]
187f	$\text{CH}_3\text{CHOH} + \text{O} \rightleftharpoons \text{CH}_3\text{CHO} + \text{OH}$	1.000E+14	0.00	0	[12]
188f	$\text{CH}_3\text{CHOH} + \text{H} \rightleftharpoons \text{C}_2\text{H}_4 + \text{H}_2\text{O}$	3.000E+13	0.00	0	[12]
189f	$\text{CH}_3\text{CHOH} + \text{H} \rightleftharpoons \text{CH}_3 + \text{CH}_2\text{OH}$	3.000E+13	0.00	0	[12]
190f	$\text{CH}_3\text{CHOH} + \text{HO}_2 \rightleftharpoons \text{CH}_3\text{CHO} + 2 \text{OH}$	4.000E+13	0.00	0	[12]
191f	$\text{CH}_3\text{CHOH} + \text{OH} \rightleftharpoons \text{CH}_3\text{CHO} + \text{H}_2\text{O}$	5.000E+12	0.00	0	[12]
192f <sup>a</sup>	$\text{CH}_3\text{CHOH} + \text{M}^{(9)} \rightleftharpoons \text{CH}_3\text{CHO} + \text{H} + \text{M}^{(9)}$	1.000E+14	0.00	105	[12]
193f	$\text{C}_3\text{H}_4 + \text{O} \rightleftharpoons \text{C}_2\text{H}_4 + \text{CO}$	2.000E+07	1.80	4.18	[41]
194f	$\text{CH}_3 + \text{C}_2\text{H}_2 \rightleftharpoons \text{C}_3\text{H}_4 + \text{H}$	2.560E+09	1.10	57.1	[41]
195f	$\text{C}_3\text{H}_4 + \text{O} \rightleftharpoons \text{HCCO} + \text{CH}_3$	7.300E+12	0.00	9.41	[41]
196f <sup>a,b</sup>	$\text{C}_3\text{H}_3 + \text{H} + \text{M} \rightleftharpoons \text{C}_3\text{H}_4 + \text{M}$	$k_0$	1.00	0	[37]
		$k_\infty$	0.00	0	
197f	$\text{C}_3\text{H}_3 + \text{HO}_2 \rightleftharpoons \text{C}_3\text{H}_4 + \text{O}_2$	2.500E+12	0.00	0	[37]
198f	$\text{C}_3\text{H}_4 + \text{OH} \rightleftharpoons \text{C}_3\text{H}_3 + \text{H}_2\text{O}$	5.300E+06	2.00	8.37	[42]
199f	$\text{C}_3\text{H}_3 + \text{O}_2 \rightleftharpoons \text{CH}_2\text{CO} + \text{HCO}$	3.000E+10	0.00	12	[43]
200f <sup>a,b</sup>	$\text{C}_3\text{H}_4 + \text{H} + \text{M} \rightleftharpoons \text{C}_3\text{H}_5 + \text{M}$	$k_0$	-2.00	0	[37]
		$k_\infty$	0.00	0	
201f	$\text{C}_3\text{H}_5 + \text{H} \rightleftharpoons \text{C}_3\text{H}_4 + \text{H}_2$	1.800E+13	0.00	0	[44]
202f	$\text{C}_3\text{H}_5 + \text{O}_2 \rightleftharpoons \text{C}_3\text{H}_4 + \text{HO}_2$	4.990E+15	-1.40	93.8	[45]

Number	Reaction	$A$	$n$	$E$	Ref.	
203f	$\text{C}_3\text{H}_5 + \text{CH}_3 \rightleftharpoons \text{C}_3\text{H}_4 + \text{CH}_4$	3.000E+12	-0.32	-0.548	[37]	
204f <sup>a,b</sup>	$\text{C}_2\text{H}_2 + \text{CH}_3 + \text{M} \rightleftharpoons \text{C}_3\text{H}_5 + \text{M}$	$k_0$	2.000E+09	1.00	0	[37]
		$k_\infty$	6.000E+08	0.00	0	
205f	$\text{C}_3\text{H}_5 + \text{OH} \rightleftharpoons \text{C}_3\text{H}_4 + \text{H}_2\text{O}$	6.000E+12	0.00	0	[37]	
206f	$\text{C}_3\text{H}_3 + \text{HCO} \rightleftharpoons \text{C}_3\text{H}_4 + \text{CO}$	2.500E+13	0.00	0	[42]	
207f	$\text{C}_3\text{H}_3 + \text{HO}_2 \rightleftharpoons \text{OH} + \text{CO} + \text{C}_2\text{H}_3$	8.000E+11	0.00	0	[41]	
208f	$\text{C}_3\text{H}_4 + \text{O}_2 \rightleftharpoons \text{CH}_3 + \text{HCO} + \text{CO}$	4.000E+14	0.00	175	[46]	
209f	$\text{C}_3\text{H}_6 + \text{O} \rightleftharpoons \text{C}_2\text{H}_5 + \text{HCO}$	3.500E+07	1.65	-4.07	[44]	
210f	$\text{C}_3\text{H}_6 + \text{OH} \rightleftharpoons \text{C}_3\text{H}_5 + \text{H}_2\text{O}$	3.100E+06	2.00	-1.25	[44]	
211f	$\text{C}_3\text{H}_6 + \text{O} \rightleftharpoons \text{CH}_2\text{CO} + \text{CH}_3 + \text{H}$	1.200E+08	1.65	1.37	[44]	
212f	$\text{C}_3\text{H}_6 + \text{H} \rightleftharpoons \text{C}_3\text{H}_5 + \text{H}_2$	1.700E+05	2.50	10.4	[44]	
213f <sup>a,b</sup>	$\text{C}_3\text{H}_5 + \text{H} + \text{M}^{(8)} \rightleftharpoons \text{C}_3\text{H}_6 + \text{M}^{(8)}$	$k_0$	1.330E+60	-12.00	25	[41]
		$k_\infty$	2.000E+14	0.00	0	
214f	$\text{C}_3\text{H}_5 + \text{HO}_2 \rightleftharpoons \text{C}_3\text{H}_6 + \text{O}_2$	2.660E+12	0.00	0	[13]	
215f	$\text{C}_3\text{H}_5 + \text{HO}_2 \rightleftharpoons \text{OH} + \text{C}_2\text{H}_3 + \text{CH}_2\text{O}$	3.000E+12	0.00	0	[13]	
216f <sup>a,b</sup>	$\text{C}_2\text{H}_3 + \text{CH}_3 + \text{M}^{(8)} \rightleftharpoons \text{C}_3\text{H}_6 + \text{M}^{(8)}$	$k_0$	4.270E+58	-11.94	40.9	[41]
		$k_\infty$	2.500E+13	0.00	0	
217f	$\text{C}_3\text{H}_6 + \text{H} \rightleftharpoons \text{C}_2\text{H}_4 + \text{CH}_3$	1.600E+22	-2.39	46.8	[41]	
218f	$\text{CH}_3 + \text{C}_2\text{H}_3 \rightleftharpoons \text{C}_3\text{H}_5 + \text{H}$	1.500E+24	-2.83	77.9	[41]	
219f <sup>a,b</sup>	$\text{C}_3\text{H}_8 + \text{M} \rightleftharpoons \text{CH}_3 + \text{C}_2\text{H}_5 + \text{M}$	$k_0$	7.830E+18	0.00	272	[32]
		$k_\infty$	1.100E+17	0.00	353	
220f	$\text{C}_3\text{H}_8 + \text{O}_2 \rightleftharpoons \text{I-C}_3\text{H}_7 + \text{HO}_2$	4.000E+13	0.00	199	[47, 41, 48]	
221f	$\text{C}_3\text{H}_8 + \text{O}_2 \rightleftharpoons \text{N-C}_3\text{H}_7 + \text{HO}_2$	4.000E+13	0.00	213	[47, 41, 48]	
222f	$\text{C}_3\text{H}_8 + \text{H} \rightleftharpoons \text{I-C}_3\text{H}_7 + \text{H}_2$	1.300E+06	2.40	18.7	[47, 41, 48]	
223f	$\text{C}_3\text{H}_8 + \text{H} \rightleftharpoons \text{N-C}_3\text{H}_7 + \text{H}_2$	1.330E+06	2.54	28.3	[48, 49]	
224f	$\text{C}_3\text{H}_8 + \text{O} \rightleftharpoons \text{I-C}_3\text{H}_7 + \text{OH}$	4.760E+04	2.71	8.82	[48, 41]	
225f	$\text{C}_3\text{H}_8 + \text{O} \rightleftharpoons \text{N-C}_3\text{H}_7 + \text{OH}$	1.900E+05	2.68	15.6	[48, 41]	
226f	$\text{C}_3\text{H}_8 + \text{OH} \rightleftharpoons \text{N-C}_3\text{H}_7 + \text{H}_2\text{O}$	1.400E+03	2.66	2.21	[41]	
227f	$\text{C}_3\text{H}_8 + \text{OH} \rightleftharpoons \text{I-C}_3\text{H}_7 + \text{H}_2\text{O}$	2.700E+04	2.39	1.65	[41]	
228f	$\text{C}_3\text{H}_8 + \text{HO}_2 \rightleftharpoons \text{I-C}_3\text{H}_7 + \text{H}_2\text{O}_2$	9.640E+03	2.60	58.2	[48, 49, 41]	
229f	$\text{C}_3\text{H}_8 + \text{HO}_2 \rightleftharpoons \text{N-C}_3\text{H}_7 + \text{H}_2\text{O}_2$	4.760E+04	2.55	69	[48, 49, 41]	
230f	$\text{I-C}_3\text{H}_7 + \text{C}_3\text{H}_8 \rightleftharpoons \text{N-C}_3\text{H}_7 + \text{C}_3\text{H}_8$	8.400E-03	4.20	36.3	[48, 50]	
231f <sup>a,b</sup>	$\text{C}_3\text{H}_6 + \text{H} + \text{M}^{(8)} \rightleftharpoons \text{I-C}_3\text{H}_7 + \text{M}^{(8)}$	$k_0$	8.700E+42	-7.50	19.8	[41]
		$k_\infty$	1.330E+13	0.00	6.53	
232f	$\text{I-C}_3\text{H}_7 + \text{O}_2 \rightleftharpoons \text{C}_3\text{H}_6 + \text{HO}_2$	1.300E+11	0.00	0	[48, 41]	
233f <sup>a,b</sup>	$\text{N-C}_3\text{H}_7 + \text{M} \rightleftharpoons \text{CH}_3 + \text{C}_2\text{H}_4 + \text{M}$	$k_0$	5.490E+49	-10.00	150	[48, 41]

Number	Reaction	$A$	$n$	$E$	Ref.	
		$k_\infty$	1.230E+13	-0.10	126	
234f <sup>a,b</sup>	H + C <sub>3</sub> H <sub>6</sub> + M <sup>(8)</sup> $\rightleftharpoons$ N-C <sub>3</sub> H <sub>7</sub> + M <sup>(8)</sup>	$k_0$	6.260E+38	-6.66	29.3	[48, 41]
		$k_\infty$	1.330E+13	0.00	13.6	
235f	N-C <sub>3</sub> H <sub>7</sub> + O <sub>2</sub> $\rightleftharpoons$ C <sub>3</sub> H <sub>6</sub> + HO <sub>2</sub>		9.000E+10	0.00	0	[48, 41]

Units are mol, cm<sup>3</sup>, kJ, K.

The backward rates for all reversible reactions can be calculated from thermodynamic data.

<sup>a</sup>Third-body efficiencies are:

$$[M] = 1 \text{ [other]}.$$

$$[M1] = 0.5 [\text{AR}] + 0.5 [\text{HE}] + 2.5 [\text{H2}] + 12 [\text{H2O}] + 1.9 [\text{CO}] + 3.8 [\text{CO2}] + 1 \text{ [other]}.$$

$$[M2] = 0.38 [\text{AR}] + 0.38 [\text{HE}] + 2.5 [\text{H2}] + 12 [\text{H2O}] + 1.9 [\text{CO}] + 3.8 [\text{CO2}] + 1 \text{ [other]}.$$

$$[M3] = 0.2 [\text{AR}] + 0.2 [\text{HE}] + 2.5 [\text{H2}] + 12 [\text{H2O}] + 1.9 [\text{CO}] + 3.8 [\text{CO2}] + 1 \text{ [other]}.$$

$$[M4] = 0.75 [\text{AR}] + 0.75 [\text{HE}] + 2.5 [\text{H2}] + 12 [\text{H2O}] + 1.9 [\text{CO}] + 3.8 [\text{CO2}] + 1 \text{ [other]}.$$

$$[M5] = 0.7 [\text{AR}] + 0.7 [\text{HE}] + 2.5 [\text{H2}] + 16 [\text{H2O}] + 1.2 [\text{CO}] + 2.4 [\text{CO2}] + 1.5 [\text{C2H6}] + 1 \text{ [other]}.$$

$$[M6] = 0.4 [\text{AR}] + 0.4 [\text{HE}] + 2 [\text{H2}] + 6 [\text{H2O}] + 1.5 [\text{CO}] + 2 [\text{CO2}] + 2 [\text{CH4}] + 3 [\text{C2H6}] + 1 \text{ [other]}.$$

$$[M7] = 1.9 [\text{H2}] + 12 [\text{H2O}] + 2.5 [\text{CO}] + 2.5 [\text{CO2}] + 1 \text{ [other]}.$$

$$[M8] = 0.7 [\text{AR}] + 2 [\text{H2}] + 6 [\text{H2O}] + 1.5 [\text{CO}] + 2 [\text{CO2}] + 2 [\text{CH4}] + 3 [\text{C2H6}] + 1 \text{ [other]}.$$

$$[M9] = 0.7 [\text{AR}] + 2 [\text{H2}] + 6 [\text{H2O}] + 1.5 [\text{CO}] + 2 [\text{CO2}] + 2 [\text{CH4}] + 1 \text{ [other]}.$$

$$[M10] = 2.4 [\text{H2}] + 15.4 [\text{H2O}] + 1.8 [\text{CO}] + 3.6 [\text{CO2}] + 1 \text{ [other]}.$$

<sup>b</sup>Pressure dependent reactions are described by the TROE-formulation [51]. The centering parameters are given by:

$$F_{c,10f} = 0.5.$$

$$F_{c,16f} = 0.265 \exp(-T/94 \text{ K}) + 0.735 \exp(-T/1756 \text{ K}) + \exp(-5182 \text{ K}/T).$$

$$F_{c,32f} = 0.2176 \exp(-T/271 \text{ K}) + 0.7824 \exp(-T/2755 \text{ K}) + \exp(-6570 \text{ K}/T).$$

$$F_{c,53f} = 0.217 \exp(-T/74 \text{ K}) + 0.783 \exp(-T/2941 \text{ K}) + \exp(-6964 \text{ K}/T).$$

$$F_{c,54f} = 0.38 \exp(-T/73 \text{ K}) + 0.62 \exp(-T/1180 \text{ K}).$$

$$F_{c,81f} = 0.16 \exp(-T/125 \text{ K}) + 0.84 \exp(-T/2219 \text{ K}) + \exp(-6882 \text{ K}/T).$$

$$F_{c,87f} = 0.832 \exp(-T/1203 \text{ K}).$$

$$F_{c,99f} = 0.7.$$

$$F_{c,136f} = 0.586 \exp(-T/279 \text{ K}) + 0.414 \exp(-T/5459 \text{ K}).$$

$$F_{c,148f} = 1.$$

$$F_{c,160f} = 0.5.$$

$$F_{c,161f} = 0.5.$$

$$F_{c,196f} = 0.5.$$

$$F_{c,200f} = 0.2.$$

$$F_{c,204f} = 0.5.$$

$$F_{c,213f} = 0.98 \exp(-T/1097 \text{ K}) + 0.02 \exp(-T/1097 \text{ K}) + \exp(-6860 \text{ K}/T).$$

$$F_{c,216f} = 0.825 \exp(-T/1341 \text{ K}) + 0.175 \exp(-T/60000 \text{ K}) + \exp(-10140 \text{ K}/T).$$

$$F_{c,219f} = 0.24 \exp(-T/1946 \text{ K}) + 0.76 \exp(-T/38 \text{ K}).$$

$$F_{c,231f} = \exp(-T/645.4 \text{ K}) + \exp(-6844 \text{ K}/T).$$

$$F_{c,233f} = 2.17 \exp(-T/251 \text{ K}) + \exp(-1185 \text{ K}/T).$$

$$F_{c,234f} = \exp(-T/1310 \text{ K}) + \exp(-48100 \text{ K}/T).$$



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