

Methane (CH₄)

1. Recommended cross section set for methane

The following cross section set was compiled so that

(1) Elastic momentum transfer cross section

Energy(eV)	Cross section(Å ²)	Energy(eV)	Cross section(Å ²)
.00000	71.29210	2.00000	5.50000
.01000	24.20010	3.00000	9.20000
.01500	16.50000	4.00000	12.20000
.02000	12.50000	5.00000	14.60000
.03000	8.40000	6.00000	16.20000
.04000	6.30000	8.00000	18.00000
.06000	4.20000	10.00000	17.00000
.08000	3.00000	12.00000	15.30000
.10000	2.10000	15.00000	12.60000
.15000	1.00000	20.00000	8.80000
.20000	.55000	30.00000	4.76000
.25000	.46000	40.00000	3.26070
.30000	.45000	60.00000	2.13000
.35000	.45500	80.00000	1.67000
.40000	.48000	100.00000	1.43000
.50000	.58000	150.00000	1.07000
.60000	.73000	200.00000	.90000
.80000	1.27000	300.00000	.71400
1.00000	1.90000	400.00000	.61200
1.20000	2.50000	600.00000	.49600
1.50000	3.55000	800.00000	.43000

(2) Vibrational excitation cross section(v24) Threshold = 0.162eV

Energy(eV)	Cross section(Å ²)	Energy(eV)	Cross section(Å ²)
.00000	.00000	2.00000	.27000
.16200	.00000	2.50000	.31500
.17000	.10000	3.00000	.38000
.18000	.20000	4.00000	.68000
.19000	.30000	5.00000	1.18000
.20000	.36000	5.60000	1.36000
.21000	.45000	6.00000	1.40000
.23000	.58000	6.50000	1.38000
.25000	.69000	7.00000	1.34000
.30000	.72000	7.50000	1.30000
.35000	.60000	8.00000	1.20000
.40000	.45000	9.00000	1.04000
.50000	.35000	10.00000	.90000
.60000	.31000	15.00000	.56000
.80000	.27000	20.00000	.46800
1.00000	.25200	40.00000	.34500
1.20000	.24500	70.00000	.20800
1.50000	.24500	100.00000	.13000

(3) Vibrational excitation cross section(v13) Threshold = 0.361eV

Energy(eV)	Cross section(\AA^2)	Energy(eV)	Cross section(\AA^2)
.00000	.00000	4.00000	.56000
.36100	.00000	5.00000	1.10000
.45000	.13000	5.60000	1.38000
.50000	.20800	6.00000	1.43000
.60000	.29900	6.50000	1.38000
.66000	.31200	7.00000	1.30000
.75000	.29900	7.50000	1.18000
.84000	.26000	8.00000	1.10000
.90000	.24500	9.00000	.90000
1.00000	.23300	10.00000	.73000
1.20000	.22200	15.00000	.36400
1.50000	.23000	20.00000	.28600
1.80000	.24000	40.00000	.16900
2.00000	.25000	70.00000	.06500
2.50000	.28500	100.00000	.03900
3.00000	.34000		

(4) Electron attachment cross section

Energy(eV)	Cross section(\AA^2)	Energy(eV)	Cross section(\AA^2)
.00000	.00000	10.50000	.92000
7.00000	.00000	11.00000	.73000
7.50000	.02000	11.50000	.53000
8.00000	.10000	12.00000	.29000
8.50000	.51000	12.50000	.15000
9.00000	.75000	13.00000	.07000
9.50000	.84000	13.50000	.02000
10.00000	.95000	14.00000	.00000
10.20000	.96000	100.00000	.00000

(5) Electronic excitation 1 Threshold = 9.0 eV

Energy(eV)	Cross section(\AA^2)	Energy(eV)	Cross section(\AA^2)
.00000	.00000	100.00000	.34000
9.00000	.00000	200.00000	.34000
10.40000	.34000	500.00000	.34000
20.00000	.34000		

(6) Electronic excitation 2 Threshold = 10.4 eV

Energy(eV)	Cross section(\AA^2)	Energy(eV)	Cross section(\AA^2)
.00000	.00000	20.00000	.59000
10.40000	.00000	100.00000	.59000
12.00000	.41000	500.00000	.59000

(7) Electronic excitation 3 Threshold = 12.0 eV

Energy(eV)	Cross section(\AA^2)	Energy(eV)	Cross section(\AA^2)
.00000	.00000	12.00000	.00000

15.00000	.68000	25.00000	1.43000
16.00000	.86000	30.00000	1.37000
18.00000	1.12000	100.00000	1.08000
20.00000	1.32000	500.00000	.70000

(8) Total ionization cross section Threshold = 12.71 eV

Energy(eV)	Cross section(\AA^2)	Energy(eV)	Cross section(\AA^2)
.00000	.00000	25.00000	1.86000
12.71000	.00000	30.00000	2.37000
13.20000	.02000	40.00000	3.05000
13.80000	.05500	50.00000	3.40000
14.40000	.12000	70.00000	3.65000
15.00000	.20000	100.00000	3.65000
20.00000	1.07000		