

Chlorine Atom

$$Z = 17$$

$$\text{Atomic Mass : } M_A = 35.453$$

$$\sigma_a(\text{Mb}) = 109.76097 \frac{df}{dE} (\text{eV}^{-1})$$

$$\mu_m = \sigma_a \cdot N_A \cdot M_A^{-1}$$

Table I. Discrete oscillator strength, f_n .

Energy (eV)	f_n	λ (Å)	Energy (eV)	f_n	λ (Å)
9.2259E+00	1.6800E-01	1.3439E+03	1.3570E+01	3.7900E-03	9.1367E+02
1.1505E+01	4.4000E-03	1.0777E+03	1.3876E+01	2.7900E-03	8.9349E+02
1.1962E+01	1.0600E-02	1.0365E+03	1.4049E+01	1.8300E-03	8.8249E+02
1.1320E+01	1.4900E-01	1.0953E+03	1.4240E+01	5.9300E-03	8.7070E+02
1.2200E+01	2.6300E-01	1.0163E+03	1.3759E+01	3.3240E-01	9.0112E+02
1.0431E+01	7.8240E-02	1.1886E+03	1.2590E+01	2.4400E-02	9.8482E+02
1.2779E+01	6.6000E-03	9.7022E+02	1.4756E+01	5.5000E-03	8.4022E+02
1.3606E+01	2.7000E-03	9.1127E+02	1.5563E+01	2.8700E-03	7.9666E+02
1.3606E+01	1.4000E-03	9.1127E+02	1.6079E+01	4.7000E-03	7.7108E+02
1.3849E+01	7.9500E-04	8.9527E+02	1.4618E+01	1.4000E-02	8.4818E+02
1.4305E+01	2.0000E-03	8.6673E+02	1.5451E+01	1.2500E-02	8.0244E+02
1.2636E+01	8.7000E-02	9.8118E+02	1.5823E+01	5.5000E-03	7.8355E+02
1.3424E+01	3.6200E-02	9.2361E+02	1.6011E+01	2.7300E-03	7.7435E+02
1.3805E+01	2.0600E-02	8.9809E+02	1.6237E+01	5.7000E-03	7.6358E+02
1.3976E+01	1.2100E-02	8.8710E+02	1.5420E+01	6.0840E-01	8.0407E+02
1.4231E+01	3.0800E-02	8.7122E+02	1.0613E+01	1.4000E-02	1.1683E+03
1.2661E+01	9.0000E-03	9.7923E+02			

Table II. Discrete oscillator strength, f_n , for resonance transitions.

Energy (eV)	f_n	λ (Å)	Energy (eV)	f_n	λ (Å)
2.7000E+02	8.0000E-03	4.5920E+01	2.8210E+03	6.6000E-03	4.3950E+00

Table III. Oscillator-strength density, df/dE , photoabsorption cross section, σ_a , and mass absorption coefficient, μ_m .

Energy (eV)	f_n (eV ⁻¹)	σ_a (Mb)	μ_m (cm ² g ⁻¹)	λ (Å)
1.6424E+01	3.7965E-01	4.1671E+01	7.0784E+05	7.5490E+02
1.7500E+01	4.0486E-01	4.4438E+01	7.5484E+05	7.0848E+02
2.0000E+01	3.7186E-01	4.0816E+01	6.9331E+05	6.1992E+02
2.2500E+01	2.9698E-01	3.2597E+01	5.5371E+05	5.5104E+02
2.5000E+01	2.2191E-01	2.4357E+01	4.1374E+05	4.9594E+02
2.7500E+01	1.5822E-01	1.7367E+01	2.9499E+05	4.5085E+02
3.0000E+01	1.0747E-01	1.1796E+01	2.0036E+05	4.1328E+02
3.5000E+01	3.8111E-02	4.1831E+00	7.1055E+04	3.5424E+02
3.8000E+01	1.3046E-02	1.4320E+00	2.4324E+04	3.2627E+02
3.9000E+01	1.0958E-02	1.2028E+00	2.0431E+04	3.1791E+02
4.0000E+01	9.6054E-03	1.0543E+00	1.7909E+04	3.0996E+02
4.1000E+01	8.7747E-03	9.6312E-01	1.6360E+04	3.0240E+02
4.2000E+01	8.3114E-03	9.1227E-01	1.5496E+04	2.9520E+02
4.3000E+01	8.1037E-03	8.8947E-01	1.5109E+04	2.8834E+02
4.5000E+01	8.1592E-03	8.9556E-01	1.5212E+04	2.7552E+02
5.0000E+01	9.4429E-03	1.0365E+00	1.7606E+04	2.4797E+02
6.0000E+01	1.1670E-02	1.2809E+00	2.1759E+04	2.0664E+02
7.0000E+01	1.2093E-02	1.3273E+00	2.2547E+04	1.7712E+02
8.0000E+01	1.1499E-02	1.2621E+00	2.1438E+04	1.5498E+02
9.0000E+01	1.0519E-02	1.1546E+00	1.9612E+04	1.3776E+02
1.0000E+02	9.4688E-03	1.0393E+00	1.7654E+04	1.2398E+02
1.2500E+02	7.2641E-03	7.9732E-01	1.3543E+04	9.9187E+01
1.5000E+02	5.5909E-03	6.1366E-01	1.0424E+04	8.2656E+01
1.7500E+02	4.3794E-03	4.8069E-01	8.1651E+03	7.0848E+01
2.0000E+02	3.4996E-03	3.8412E-01	6.5248E+03	6.1992E+01
2.0799E+02	3.2708E-03	3.5901E-01	6.0982E+03	5.9611E+01
2.0800E+02	4.5537E-02	4.9981E+00	8.4900E+04	5.9608E+01
2.2500E+02	2.9989E-02	3.2916E+00	5.5913E+04	5.5104E+01
2.5000E+02	2.2547E-02	2.4748E+00	4.2038E+04	4.9594E+01
2.7500E+02	2.0713E-02	2.2735E+00	3.8618E+04	4.5085E+01
3.0000E+02	1.9895E-02	2.1836E+00	3.7092E+04	4.1328E+01
3.5000E+02	1.7710E-02	1.9438E+00	3.3019E+04	3.5424E+01
4.0000E+02	1.4751E-02	1.6191E+00	2.7502E+04	3.0996E+01
4.5000E+02	1.1785E-02	1.2935E+00	2.1973E+04	2.7552E+01
5.0000E+02	9.1932E-03	1.0091E+00	1.7140E+04	2.4797E+01
6.0000E+02	5.3652E-03	5.8889E-01	1.0003E+04	2.0664E+01

Table III. Oscillator-strength density, df/dE , photoabsorption cross section, σ_a , and mass absorption coefficient, μ_m . (Continued)

Energy (eV)	f_n (eV ⁻¹)	σ_a (Mb)	μ_m (cm ² g ⁻¹)	λ (Å)
7.0500E+02	3.6806E-03	4.0399E-01	6.8623E+03	1.7586E+01
8.0000E+02	2.6765E-03	2.9378E-01	4.9902E+03	1.5498E+01
9.0000E+02	1.9821E-03	2.1756E-01	3.6956E+03	1.3776E+01
1.0000E+03	1.5109E-03	1.6584E-01	2.8170E+03	1.2398E+01
1.2500E+03	8.4369E-04	9.2605E-02	1.5730E+03	9.9187E+00
1.5000E+03	5.2083E-04	5.7167E-02	9.7105E+02	8.2656E+00
1.7500E+03	3.4531E-04	3.7902E-02	6.4381E+02	7.0848E+00
2.0000E+03	2.4151E-04	2.6509E-02	4.5028E+02	6.1992E+00
2.2500E+03	1.7607E-04	1.9326E-02	3.2827E+02	5.5104E+00
2.5000E+03	1.3269E-04	1.4564E-02	2.4739E+02	4.9594E+00
2.7500E+03	1.0274E-04	1.1276E-02	1.9154E+02	4.5085E+00
2.8300E+03	9.5130E-05	1.0442E-02	1.7736E+02	4.3811E+00
2.8300E+03	9.2362E-04	1.0138E-01	1.7220E+03	4.3811E+00
3.0000E+03	7.9941E-04	8.7744E-02	1.4904E+03	4.1328E+00
3.5000E+03	5.4008E-04	5.9279E-02	1.0069E+03	3.5424E+00
4.0000E+03	3.8062E-04	4.1777E-02	7.0963E+02	3.0996E+00
4.5000E+03	2.7776E-04	3.0488E-02	5.1787E+02	2.7552E+00
5.0000E+03	2.0867E-04	2.2903E-02	3.8904E+02	2.4797E+00
6.0000E+03	1.2621E-04	1.3853E-02	2.3530E+02	2.0664E+00
7.0000E+03	8.1977E-05	8.9979E-03	1.5284E+02	1.7712E+00
8.0000E+03	5.6196E-05	6.1682E-03	1.0477E+02	1.5498E+00
9.0000E+03	4.0178E-05	4.4100E-03	7.4909E+01	1.3776E+00
1.0000E+04	2.9763E-05	3.2668E-03	5.5490E+01	1.2398E+00
1.2500E+04	1.5549E-05	1.7066E-03	2.8989E+01	9.9187E-01
1.5000E+04	9.0109E-06	9.8905E-04	1.6800E+01	8.2656E-01
1.7500E+04	5.6818E-06	6.2364E-04	1.0593E+01	7.0848E-01
2.0000E+04	3.8110E-06	4.1830E-04	7.1054E+00	6.1992E-01
2.2500E+04	2.6798E-06	2.9414E-04	4.9963E+00	5.5104E-01
2.5000E+04	1.9558E-06	2.1467E-04	3.6464E+00	4.9594E-01
2.7500E+04	1.4651E-06	1.6081E-04	2.7315E+00	4.5085E-01
3.0000E+04	1.1183E-06	1.2274E-04	2.0850E+00	4.1328E-01
3.5000E+04	6.9225E-07	7.5982E-05	1.2907E+00	3.5424E-01
4.0000E+04	4.5701E-07	5.0162E-05	8.5206E-01	3.0996E-01
4.5000E+04	3.1687E-07	3.4780E-05	5.9078E-01	2.7552E-01
5.0000E+04	2.2832E-07	2.5061E-05	4.2569E-01	2.4797E-01
6.0000E+04	1.2947E-07	1.4211E-05	2.4139E-01	2.0664E-01

Table III. Oscillator-strength density, df/dE , photoabsorption cross section, σ_a , and mass absorption coefficient, μ_m . (Continued)

Energy (eV)	f_n (eV ⁻¹)	σ_a (Mb)	μ_m (cm ² g ⁻¹)	λ (Å)
7.0000E+04	7.9566E-08	8.7332E-06	1.4834E-01	1.7712E-01
8.0000E+04	5.2141E-08	5.7230E-06	9.7213E-02	1.5498E-01
9.0000E+04	3.5908E-08	3.9413E-06	6.6948E-02	1.3776E-01
1.0000E+05	2.5715E-08	2.8225E-06	4.7944E-02	1.2398E-01

When photon energy, E , is higher than 10^5 eV, the photoabsorption cross section, σ_a , in Mb is given by

$$\sigma_a = 680 (Z - 0.3)^6 \left(\frac{Ry}{E} \right)^4 \frac{\exp[-4\chi \arctan(\chi^{-1})]}{1 - \exp(-2\pi\chi)} .$$

Here χ is represented by

$$\chi = \sqrt{\frac{E_K}{E - E_K}} ,$$

where $E_K = 2830.2$ eV.

