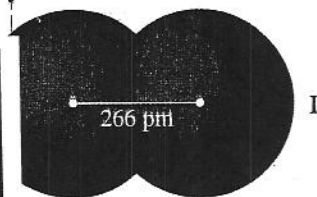
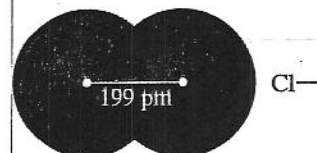


Table 9.1 Some Representative Bond Lengths and Bond Energies

Bond	Bond Length, pm	Bond Energy, <sup>a</sup> kJ/mol	Bond	Bond Length, pm	Bond Energy, <sup>a</sup> kJ/mol
H—H	74	436	C—O	143	360
H—C	110	414	C=O	120	736 <sup>b</sup>
H—N	100	389	C—Cl	178	339
H—O	97	464	N—N	145	163
H—S	132	368	N=N	123	418
H—F	92	565	N≡N	110	946
H—Cl	127	431	N—O	136	222
H—Br	141	364	N=O	120	590
H—I	161	297	O—O	145	142
C—C	154	347	O=O	121	498
C=C	134	611	F—F	143	159
C≡C	120	837	Cl—Cl	199	243
C—N	147	305	Br—Br	228	193
C=N	128	615	I—I	266	151
C≡N	116	891			



and lengths of five common diatomic molecules.

Table 8.6 Some Selected First Electron Affinities, kJ/mol

1A	2A	3A	4A	5A	6A	7A	8A
Li	Be	B	C	N	O	F	Ne
-60	>0	-27	-154	≈0	-141	-328	>0
Na					S	Cl	
-53					-200	-349	
K					Se	Br	
-48					-195	-325	
Rb					Te	I	
-47					-190	-295	
Cs					Po	At	
-46					-183	-270	

Table 8.4 Ionization Energies of Group 1A and Group 2A Elements, kJ/mol

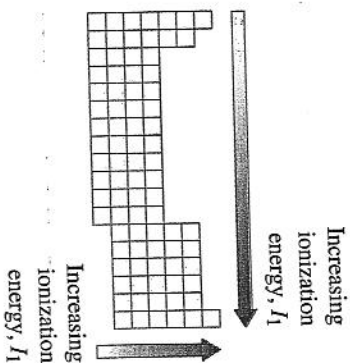
1A	2A
Li	Be
520	900
Na	Mg
7298	738
K	Ca
4562	1451
Rb	Sr
419	550
3051	1064
Cs	Ba
376	503
2230	965

Periodic Trends: Ionization Energies animation

The first ionization energy,  $I_1$ , is the energy required to remove the outermost electron from a neutral atom in the gas phase. The first ionization energy of boron is 801 kJ/mol, and the first ionization energy of fluorine is 1681 kJ/mol. The first ionization energy of cesium is 376 kJ/mol, and the first ionization energy of francium is estimated to be 380 kJ/mol. The first ionization energy of helium is 2372 kJ/mol, and the first ionization energy of neon is 2081 kJ/mol. The first ionization energy of argon is 1521 kJ/mol, and the first ionization energy of krypton is 1351 kJ/mol. The first ionization energy of xenon is 1171 kJ/mol, and the first ionization energy of radon is 1037 kJ/mol. The first ionization energy of francium is estimated to be 380 kJ/mol, and the first ionization energy of actinium is 377 kJ/mol. The first ionization energy of thorium is 583 kJ/mol, and the first ionization energy of protactinium is 489 kJ/mol. The first ionization energy of uranium is 398 kJ/mol, and the first ionization energy of neptunium is 396 kJ/mol. The first ionization energy of plutonium is 394 kJ/mol, and the first ionization energy of americium is 393 kJ/mol. The first ionization energy of curium is 391 kJ/mol, and the first ionization energy of berkelium is 390 kJ/mol. The first ionization energy of californium is 389 kJ/mol, and the first ionization energy of einsteinium is 388 kJ/mol. The first ionization energy of fermium is 387 kJ/mol, and the first ionization energy of mendelevium is 386 kJ/mol. The first ionization energy of nobelium is 385 kJ/mol, and the first ionization energy of lawrencium is 384 kJ/mol. The first ionization energy of rutherfordium is 383 kJ/mol, and the first ionization energy of dubnium is 382 kJ/mol. The first ionization energy of seaborgium is 381 kJ/mol, and the first ionization energy of bohrium is 380 kJ/mol. The first ionization energy of hassium is 379 kJ/mol, and the first ionization energy of meitnerium is 378 kJ/mol. The first ionization energy of darmstadtium is 377 kJ/mol, and the first ionization energy of roentgenium is 376 kJ/mol. The first ionization energy of copernicium is 375 kJ/mol, and the first ionization energy of nihonium is 374 kJ/mol. The first ionization energy of flerovium is 373 kJ/mol, and the first ionization energy of livermorium is 372 kJ/mol. The first ionization energy of tennessine is 371 kJ/mol, and the first ionization energy of oganesson is 370 kJ/mol.

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