Figure 8.6 Electronegativities of the Elements

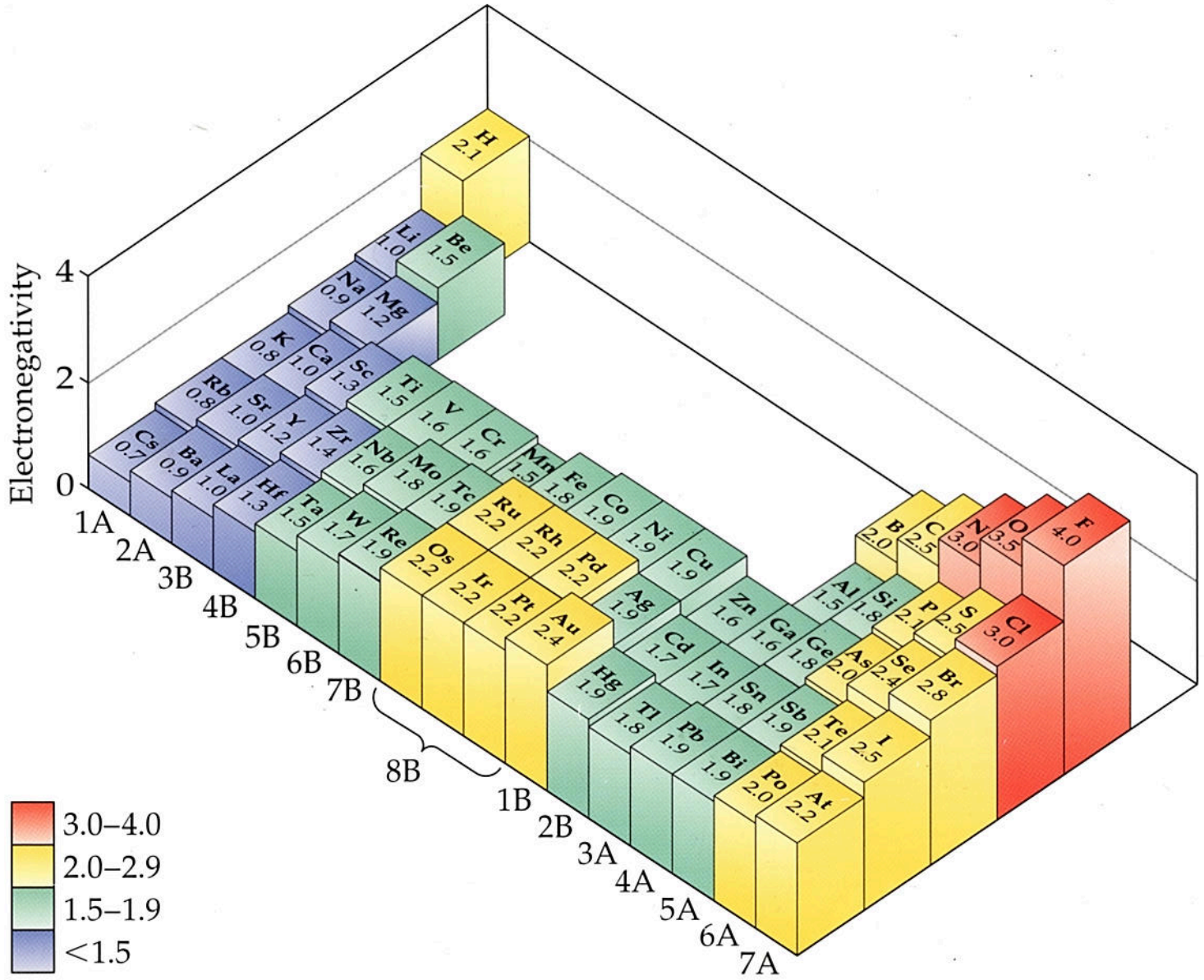

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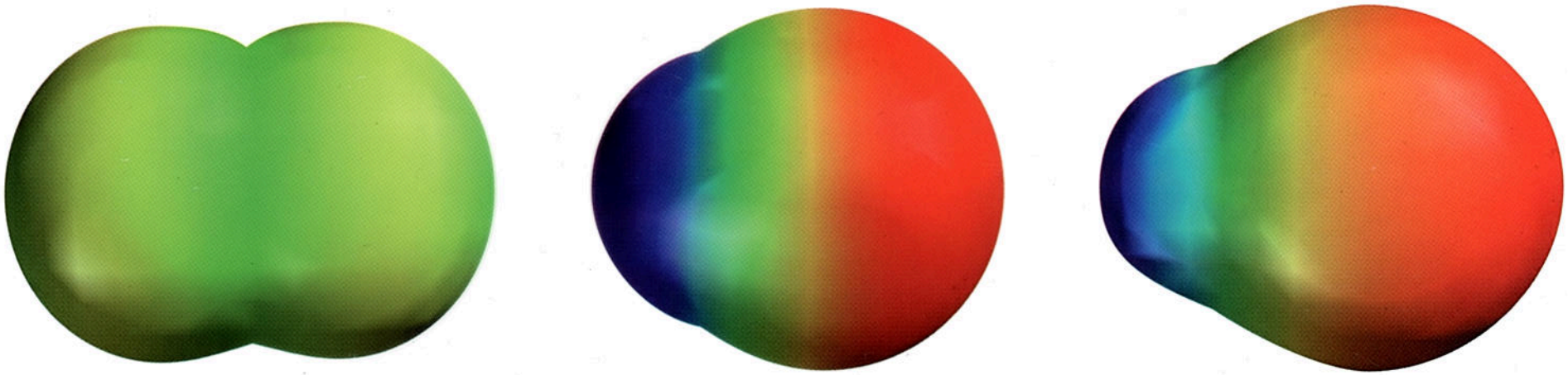
Figure 8.7 Electron Distributions in F_2, HF and LiF



F_2 HF LiF

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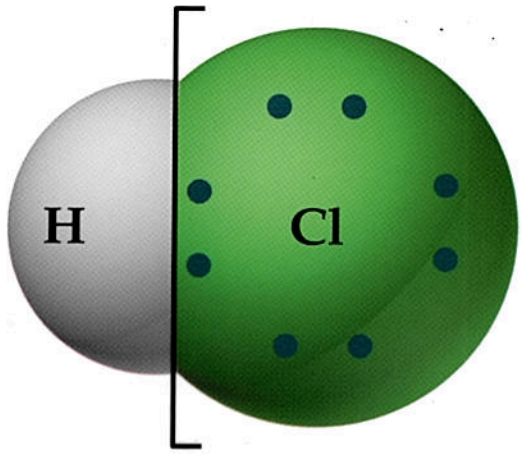
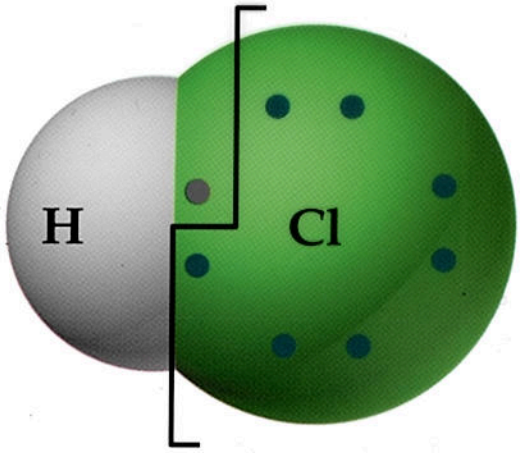
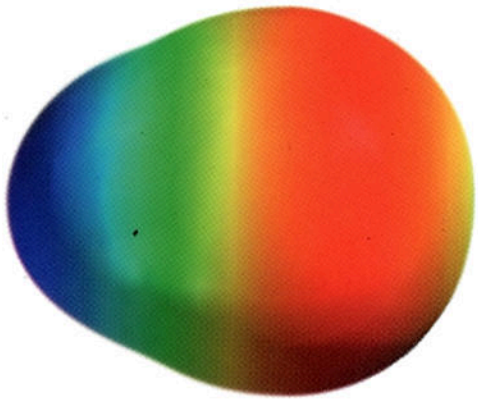
Figure 8.9 Oxidation Numbers and Formal Charges



(a)



(b)



(c)

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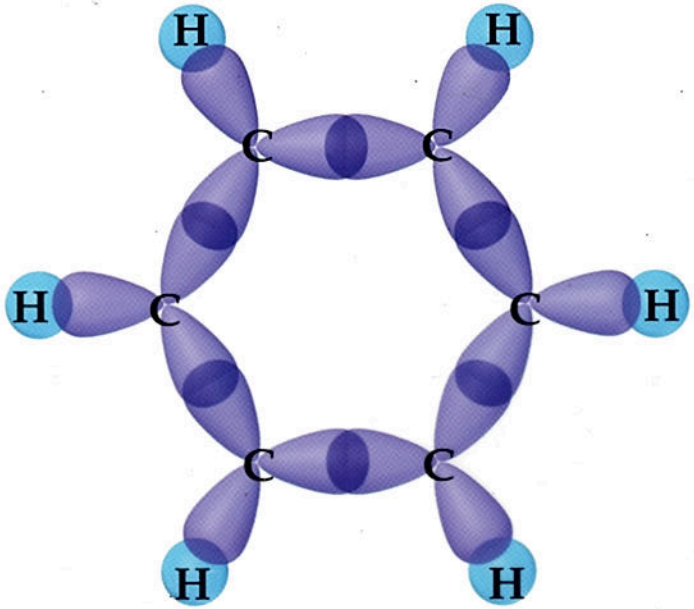
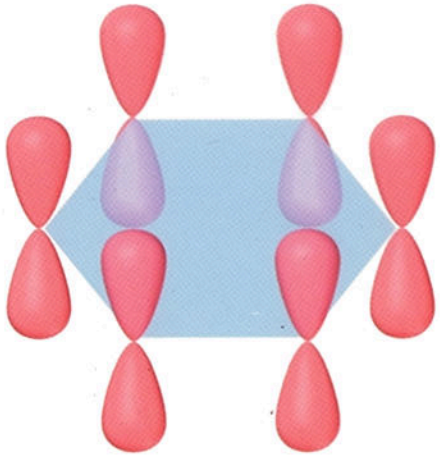
Figure 9.28 Bonding in Benzene



(a) σ bonds



(b) $2p$ atomic orbitals

(c) Delocalized π bonds

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Figure 10.29

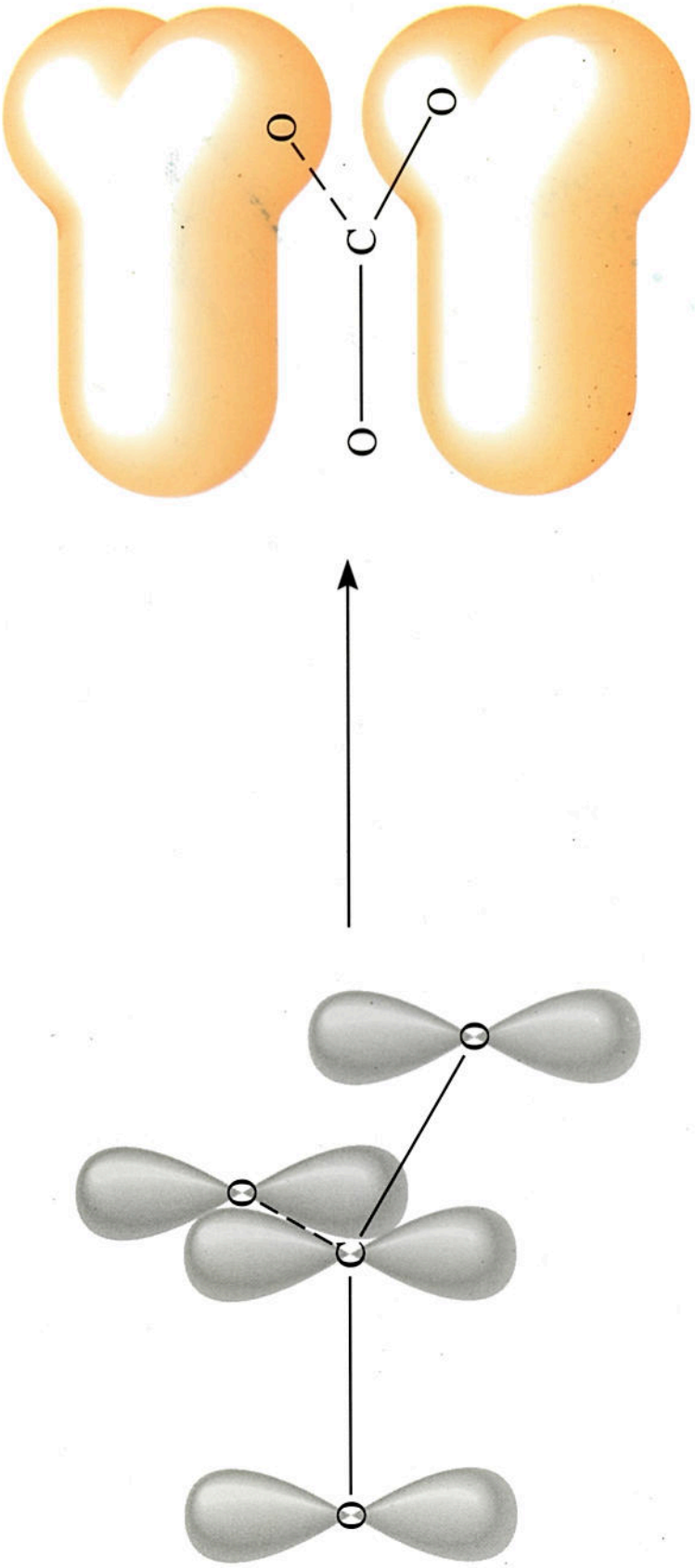

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Figure 8.3 Crystal Structure of NaCl

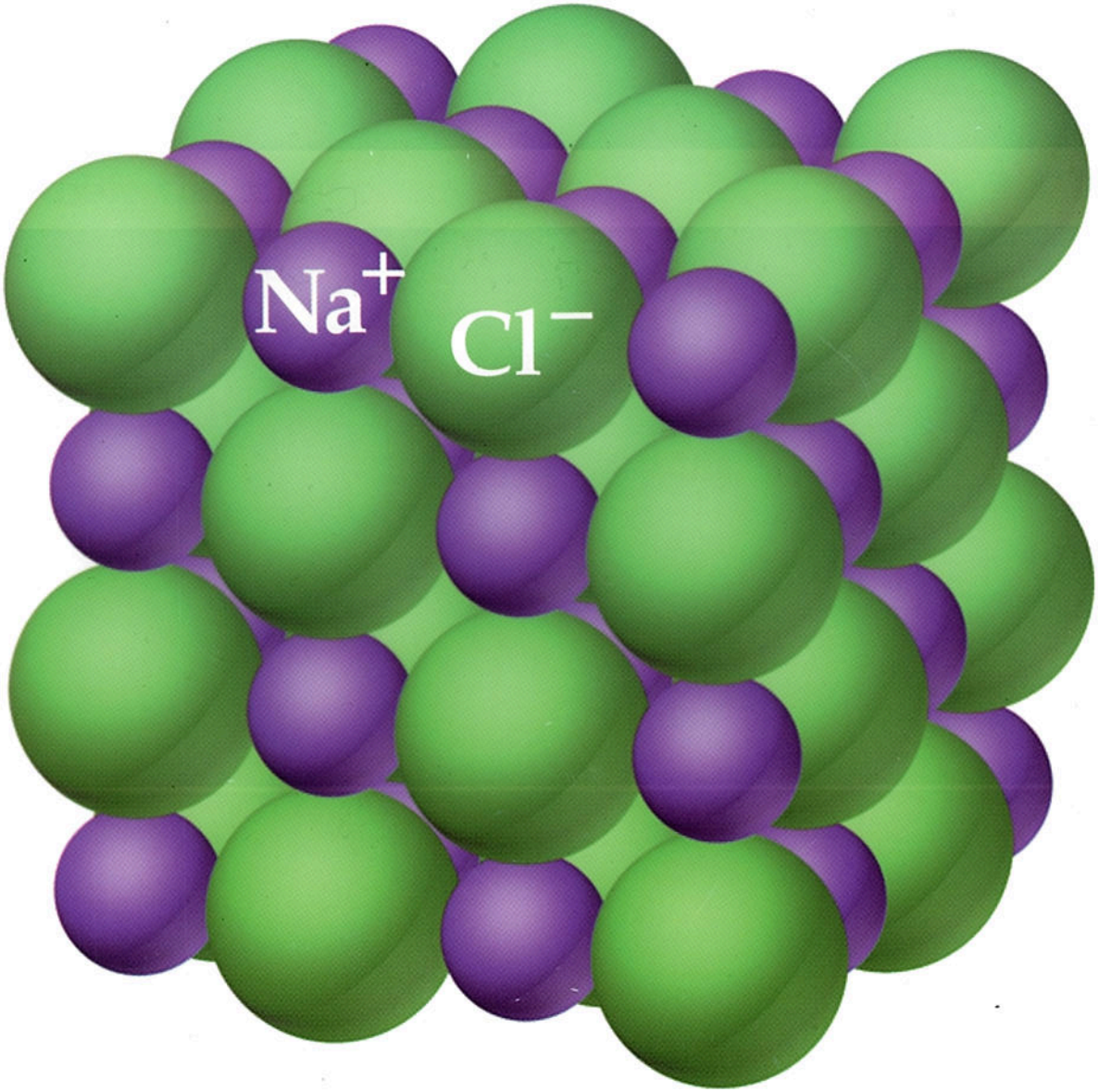

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Table 8.4 Average Bond Enthalpies

TABLE 8.4 Average Bond Enthalpies (kJ/mol)

Single Bonds

C—H	413	N—H	391	O—H	463	F—F	155
C—C	348	N—N	163	O—O	146		
C—N	293	N—O	201	O—F	190	Cl—F	253
C—O	358	N—F	272	O—Cl	203	Cl—Cl	242
C—F	485	N—Cl	200	O—I	234		
C—Cl	328	N—Br	243			Br—F	237
C—Br	276			S—H	339	Br—Cl	218
C—I	240	H—H	436	S—F	327	Br—Br	193
C—S	259	H—F	567	S—Cl	253		
		H—Cl	431	S—Br	218	I—Cl	208
Si—H	323	H—Br	366	S—S	266	I—Br	175
Si—Si	226	H—I	299			I—I	151
Si—C	301						
Si—O	368						
Si—Cl	464						

Multiple Bonds

C=C	614	N=N	418	O_2	495
C≡C	839	N≡N	941		
C=N	615	N=O	607	S=O	523
C≡N	891			S=S	418
C=O	799				
C≡O	1072				

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TABLE 8.5 Average Bond Lengths for Some Single, Double, and Triple Bonds

Bond	Bond Length (Å)	Bond	Bond Length (Å)
C—C	1.54	N—N	1.47
C=C	1.34	N=N	1.24
C≡C	1.20	N≡N	1.10
C—N	1.43	N—O	1.36
C=N	1.38	N=O	1.22
C≡N	1.16		
		O—O	1.48
C—O	1.43	O=O	1.21
C=O	1.23		
C≡O	1.13		

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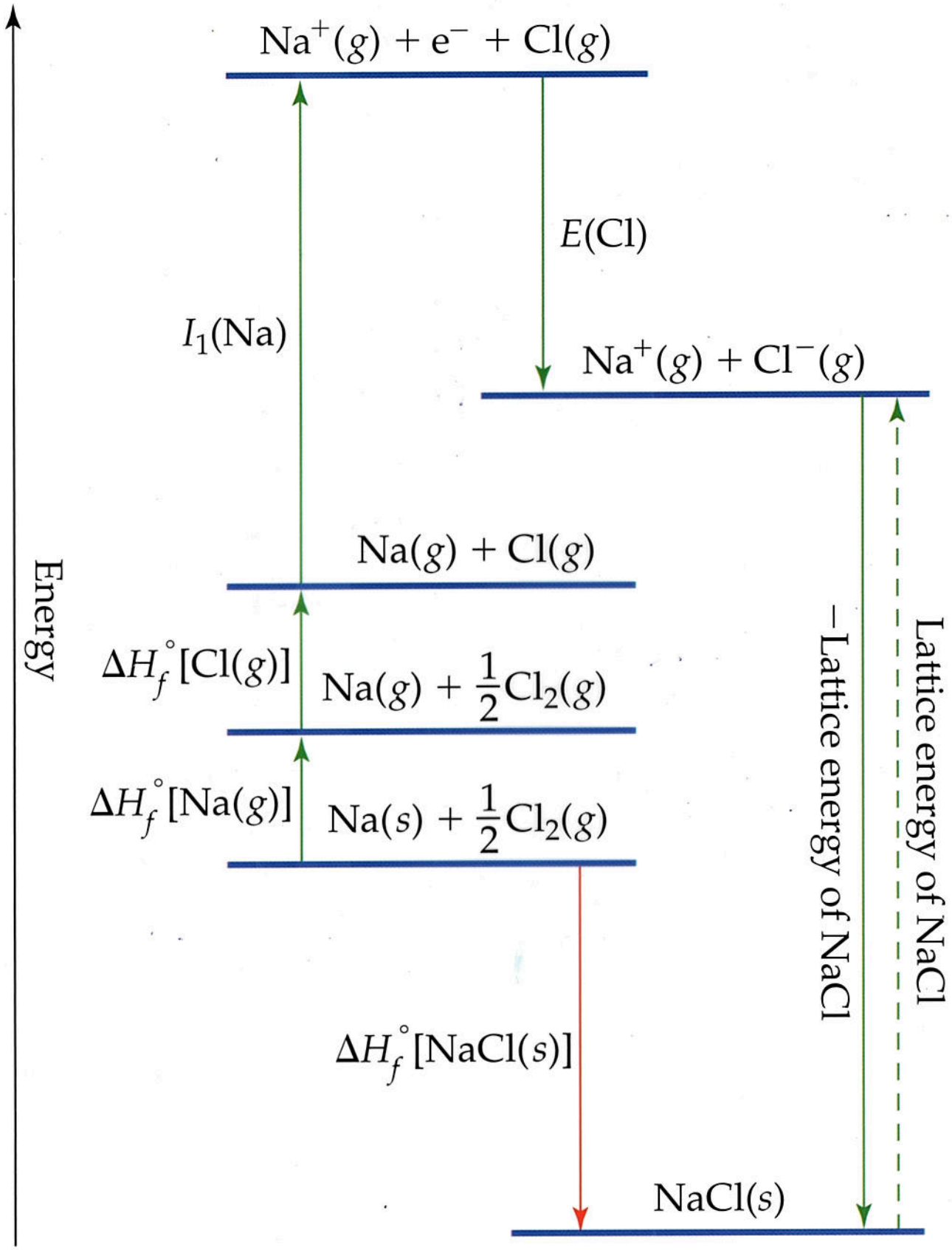
Figure 8.4 Born-Haber Cycle



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T-92 Figure 9.19 Formation of sp^3 Hybrid Orbitals

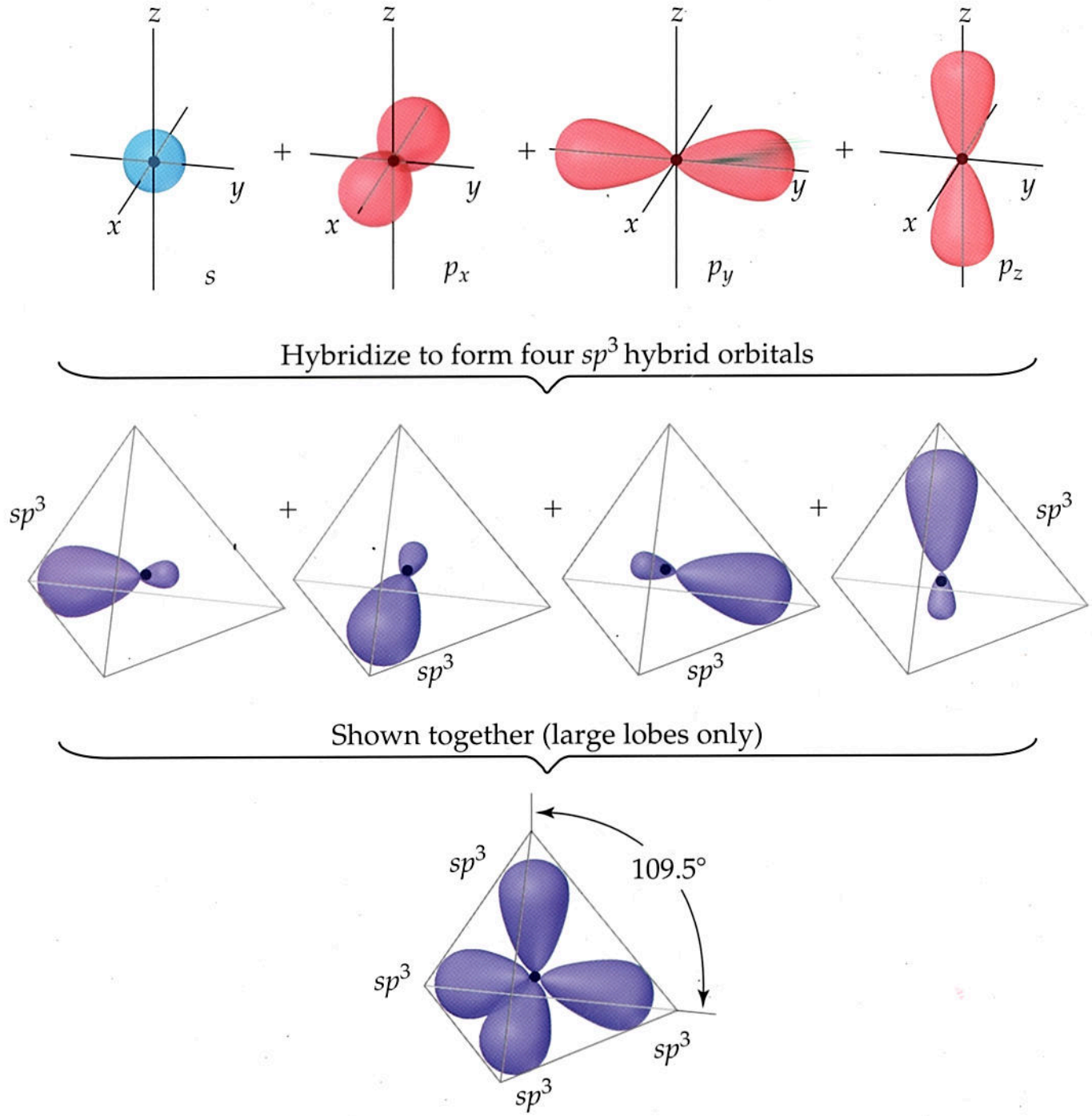

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Figure 9.18 Formation of sp^2 Hybrid Orbitals

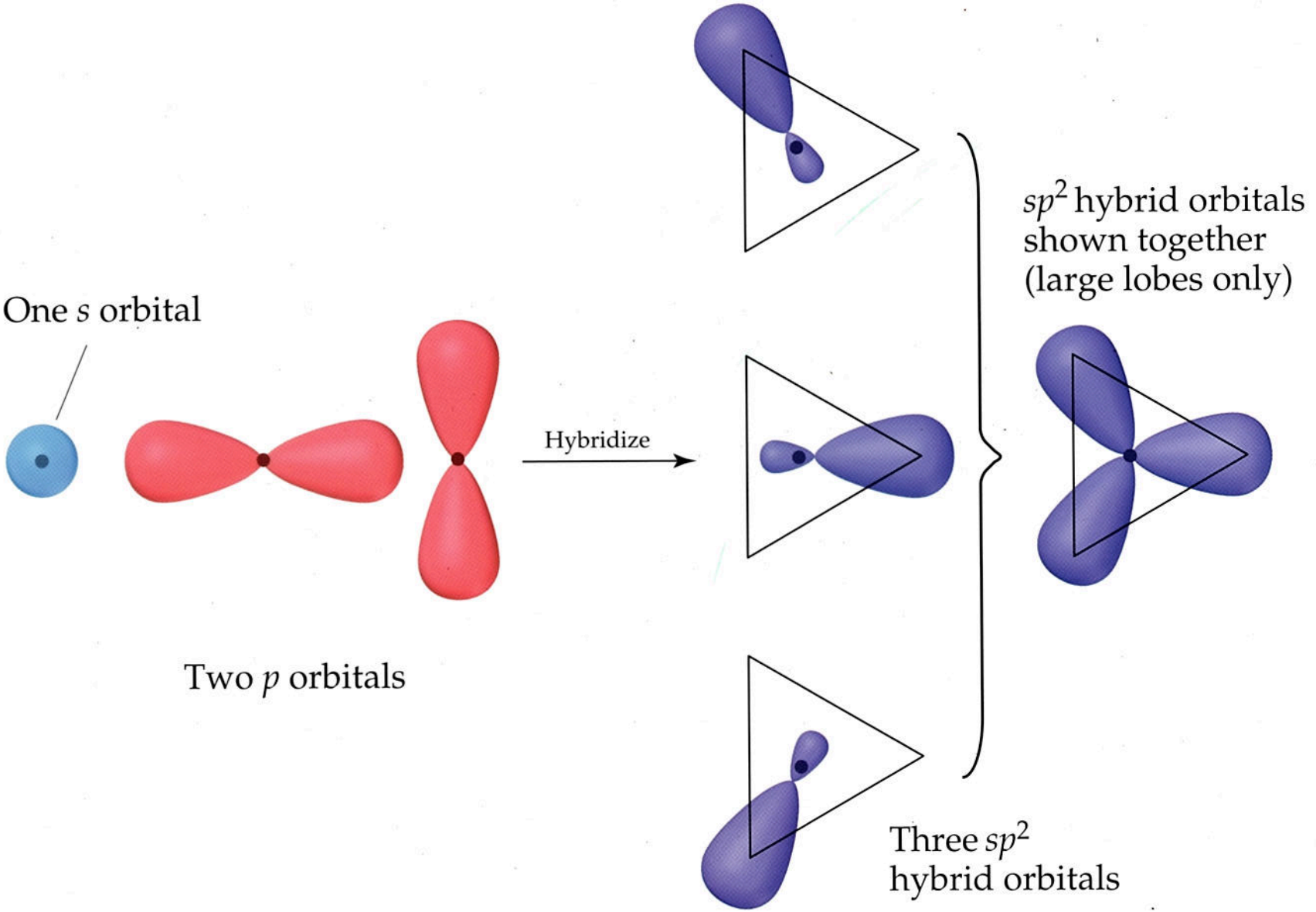

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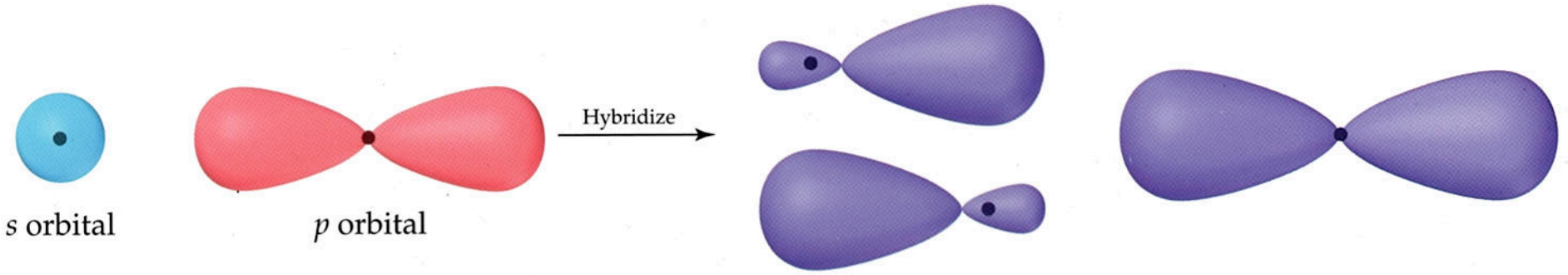
Figure 9.16 Formation of *sp* Hybrid Orbitals



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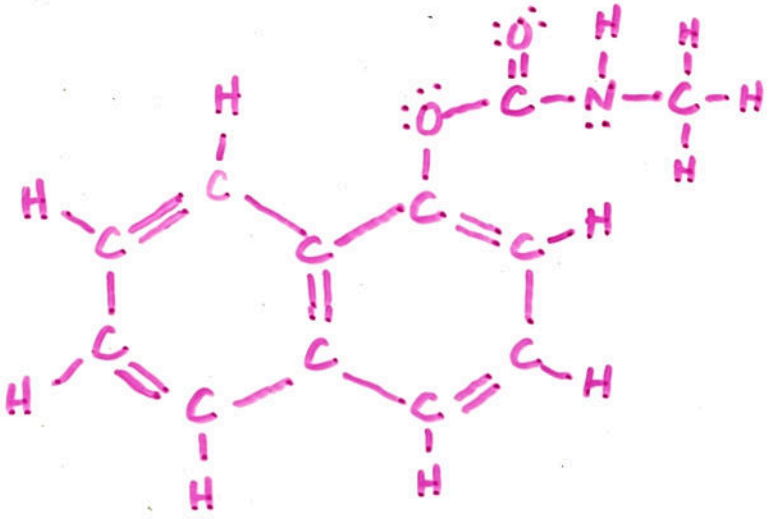
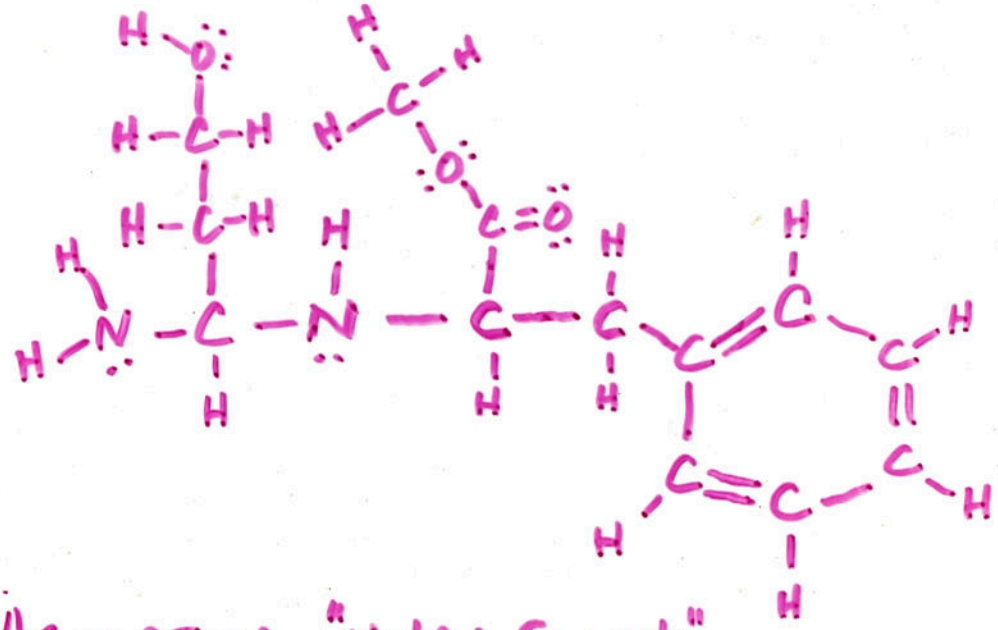


How many σ bonds?
How many π bonds?

"Sevin" commercial insecticide



Aspartame "NutraSweet"

How many σ bonds?
How many π bonds?

Figure 9.33 Formation of MOs of H_2

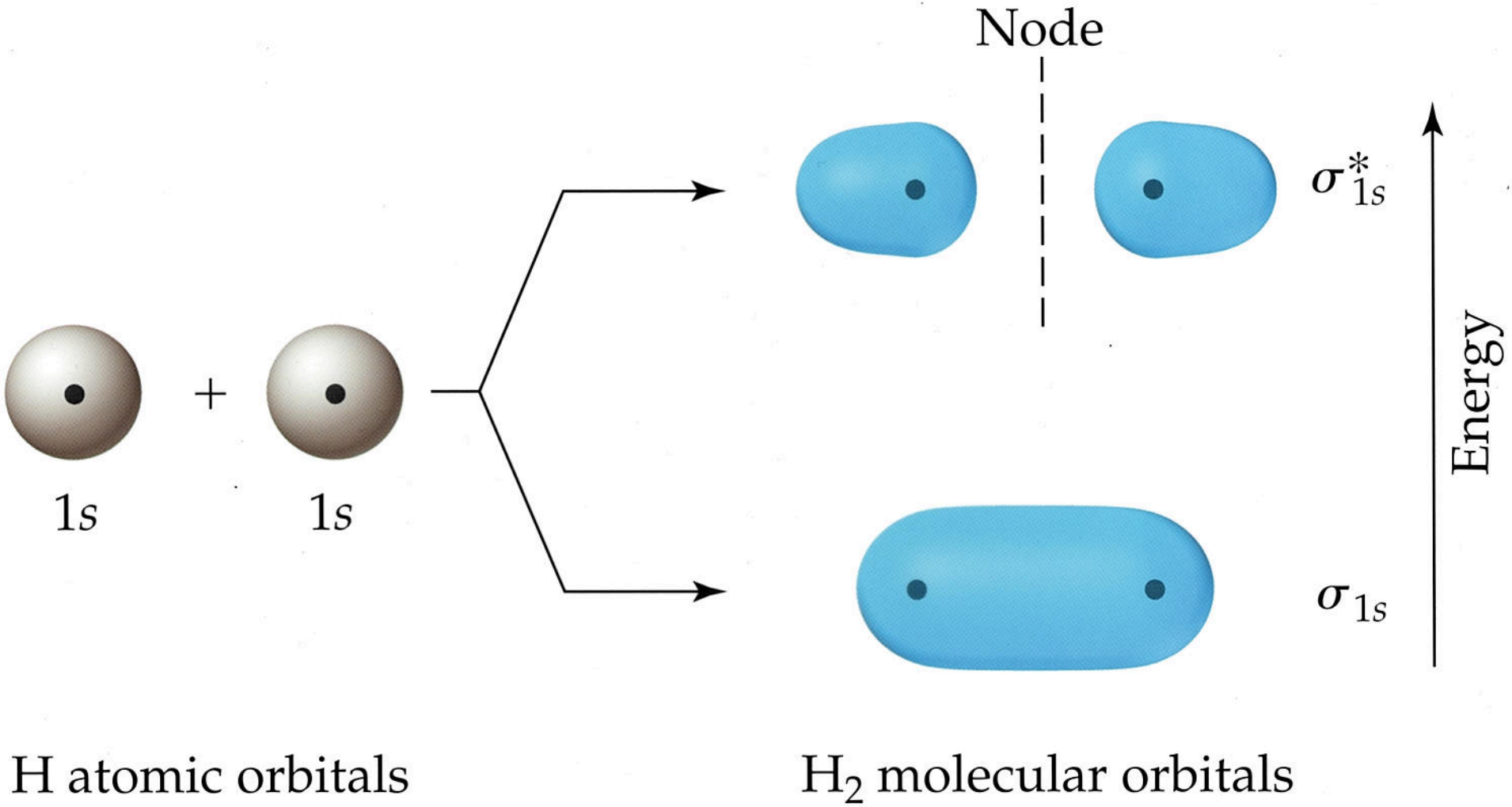


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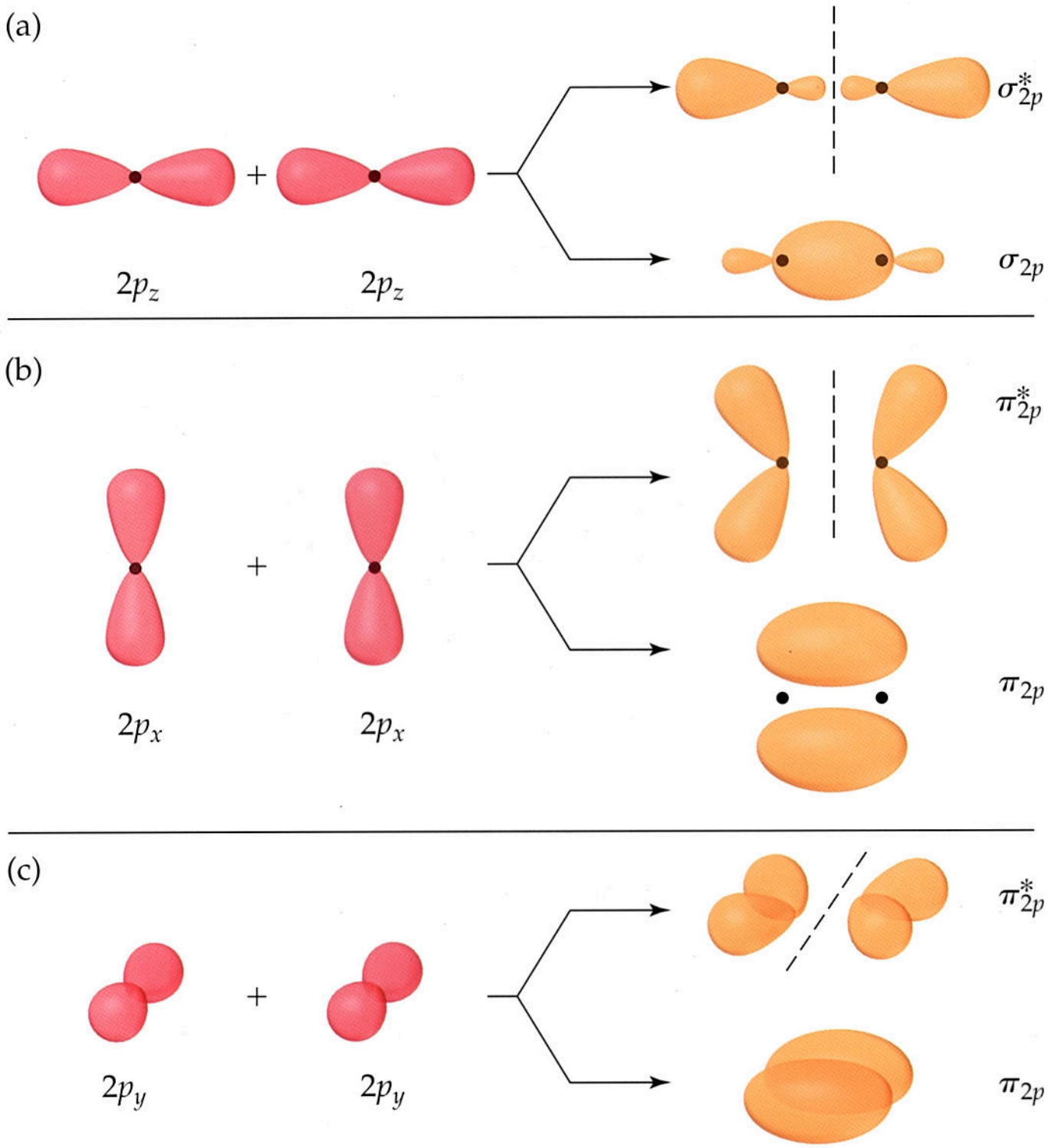
Figure 9.37 Molecular Orbitals Formed by 2*p* Orbitals



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