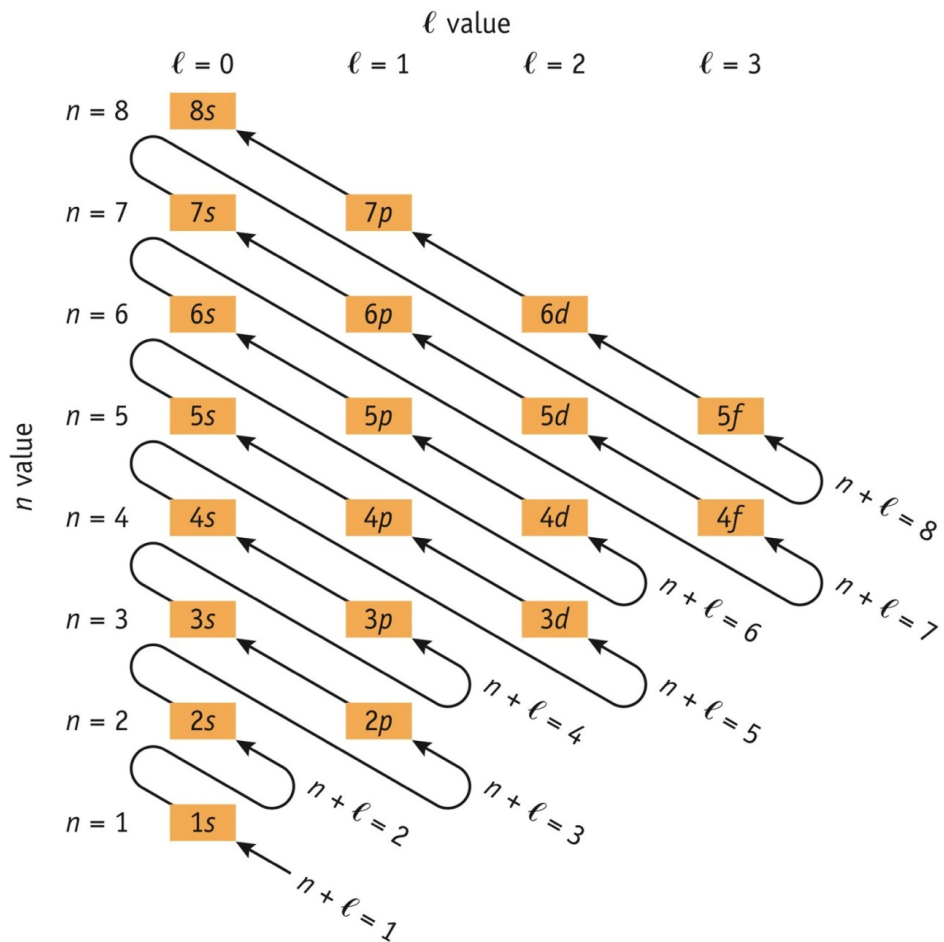
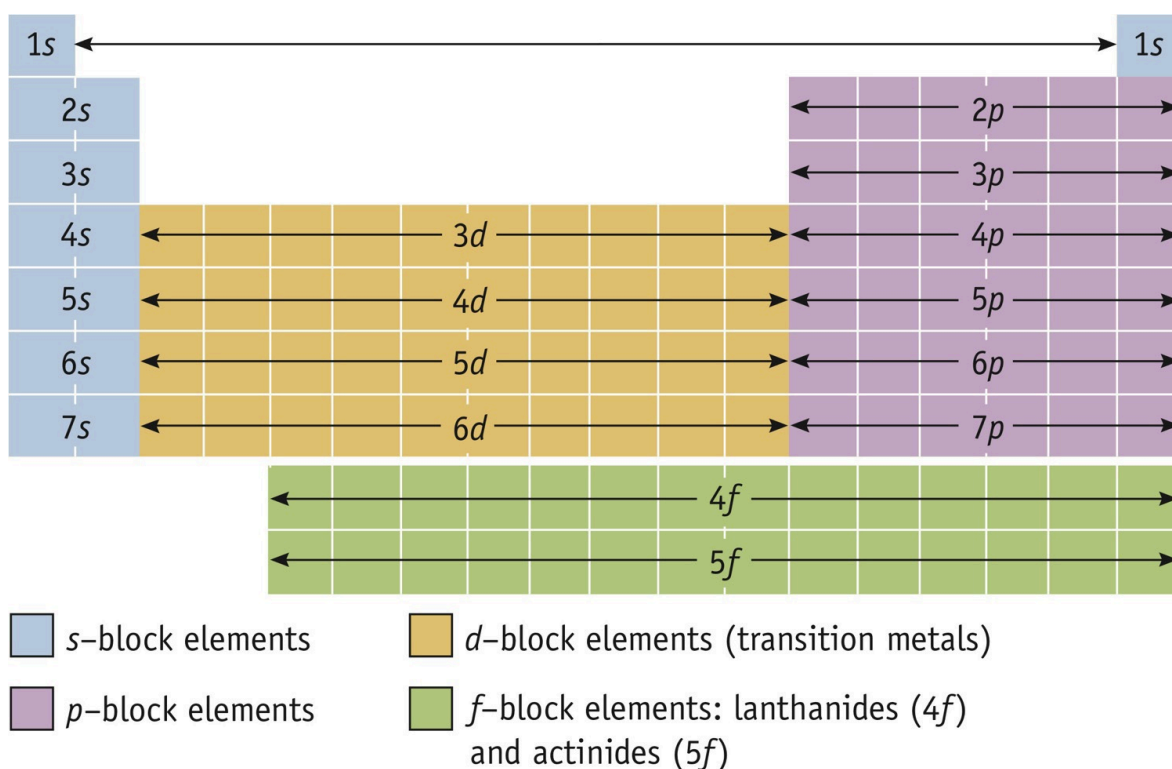
















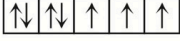







# Subshell Filling Order



# Orbital Filling of Electrons



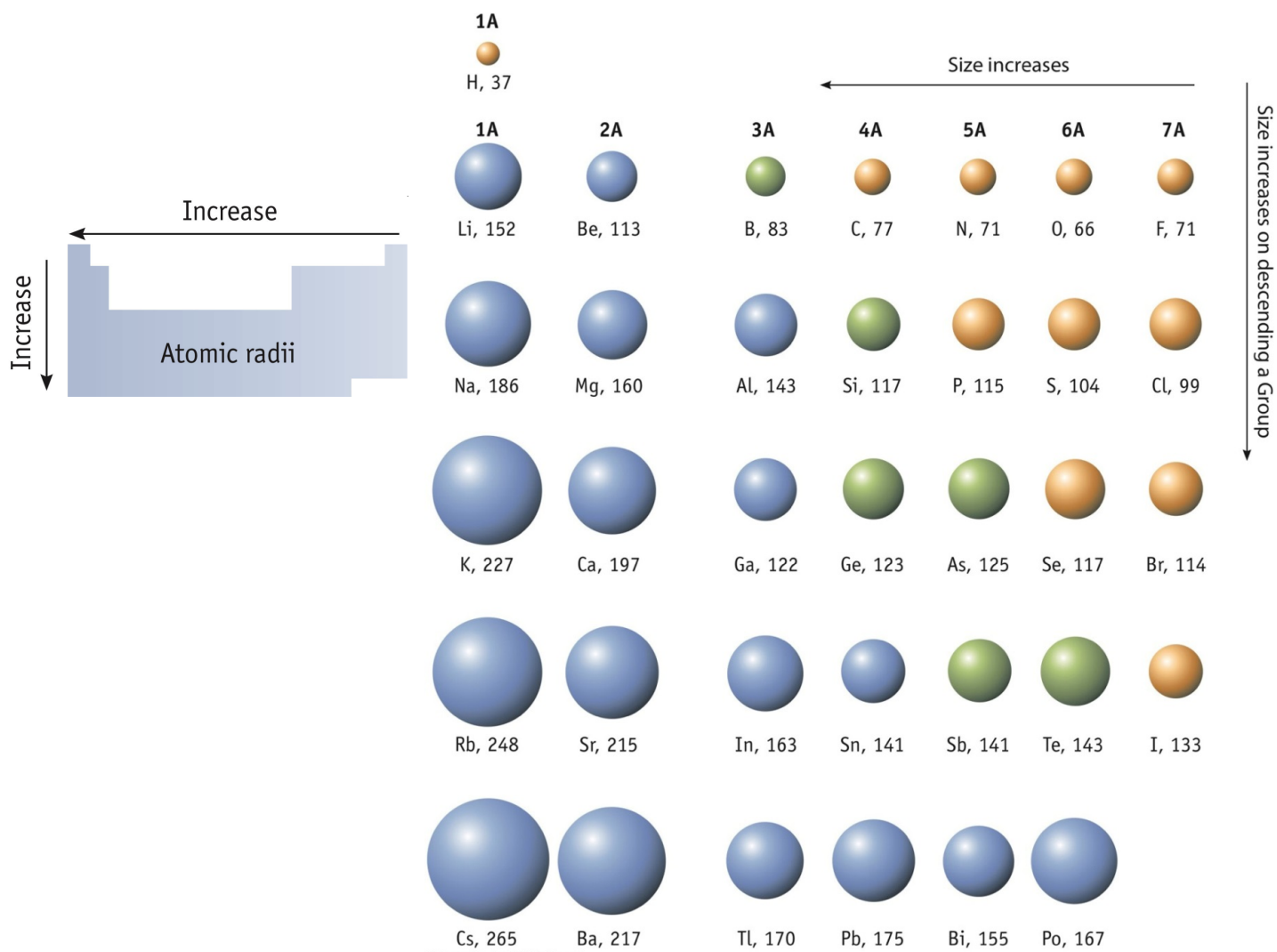
**Table 7.4** Orbital Box Diagrams for the Elements Ca Through Zn

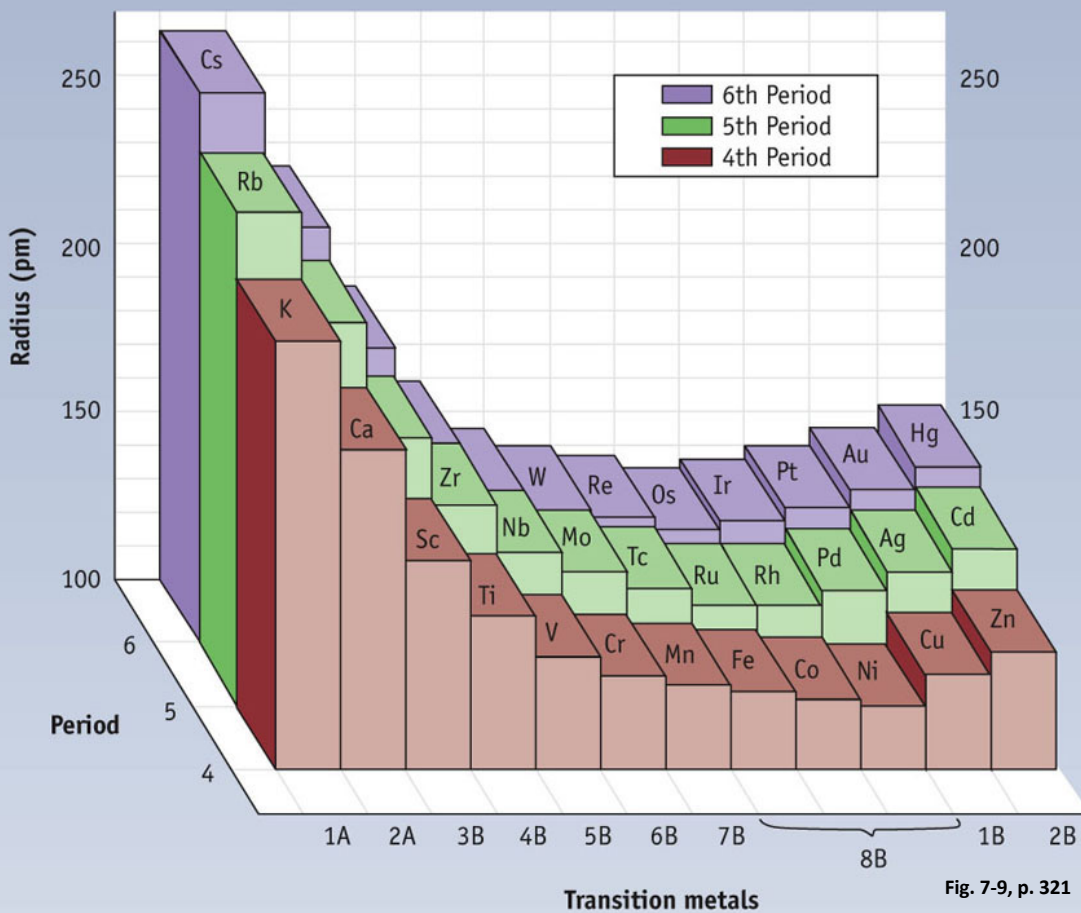
		3d	4s
Ca	[Ar]4s <sup>2</sup>		
Sc	[Ar]3d <sup>1</sup> 4s <sup>2</sup>		
Ti	[Ar]3d <sup>2</sup> 4s <sup>2</sup>		
V	[Ar]3d <sup>3</sup> 4s <sup>2</sup>		
Cr*	[Ar]3d <sup>5</sup> 4s <sup>1</sup>		
Mn	[Ar]3d <sup>5</sup> 4s <sup>2</sup>		
Fe	[Ar]3d <sup>6</sup> 4s <sup>2</sup>		
Co	[Ar]3d <sup>7</sup> 4s <sup>2</sup>		
Ni	[Ar]3d <sup>8</sup> 4s <sup>2</sup>		
Cu*	[Ar]3d <sup>10</sup> 4s <sup>1</sup>		
Zn	[Ar]3d <sup>10</sup> 4s <sup>2</sup>		

\*See *A Closer Look: Questions about Transition Element Electron Configurations*, page 263.

© Cengage Learning. All Rights Reserved.

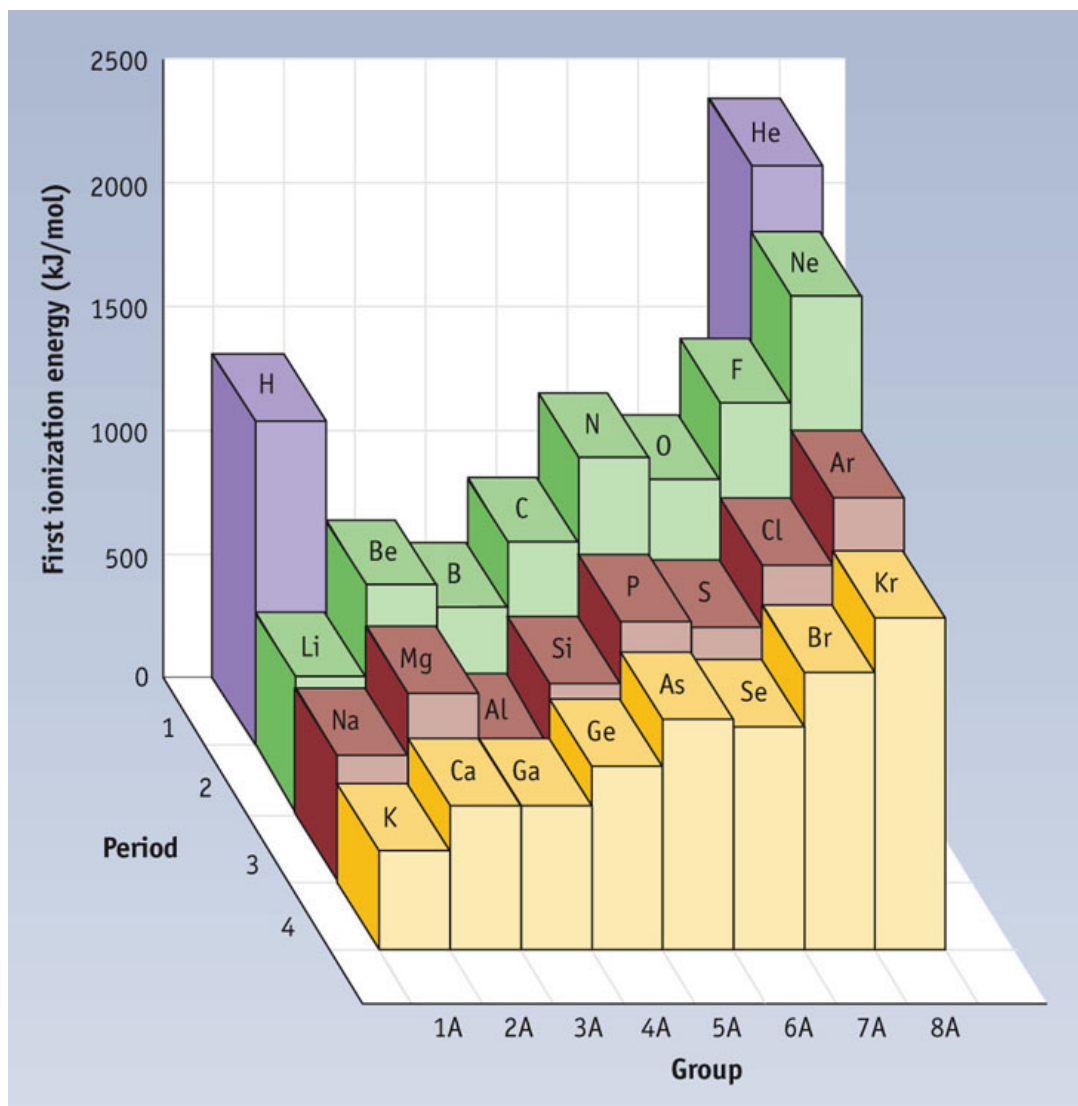
# Atomic Radii of Elements





**TABLE 7.5** First, Second, and Third Ionization Energies for the Main Group Elements in Periods 2–4 (kJ/mol)

2nd Period	Li	Be	B	C	N	O	F	Ne
1st	513	899	801	1086	1402	1314	1681	2080
2nd	7298	1757	2427	2352	2856	3388	3374	3952
3rd	11815	14848	3660	4620	4578	5300	6050	6122
3rd Period	Na	Mg	Al	Si	P	S	Cl	Ar
1st	496	738	577	787	1012	1000	1251	1520
2nd	4562	1451	1817	1577	1903	2251	2297	2665
3rd	6912	7732	2745	3231	2912	3361	3826	3928
4th Period	K	Ca	Ga	Ge	As	Se	Br	Kr
1st	419	590	579	762	947	941	1140	1351
2nd	3051	1145	1979	1537	1798	2044	2104	2350
3rd	4411	4910	2963	3302	2735	2974	3500	3565



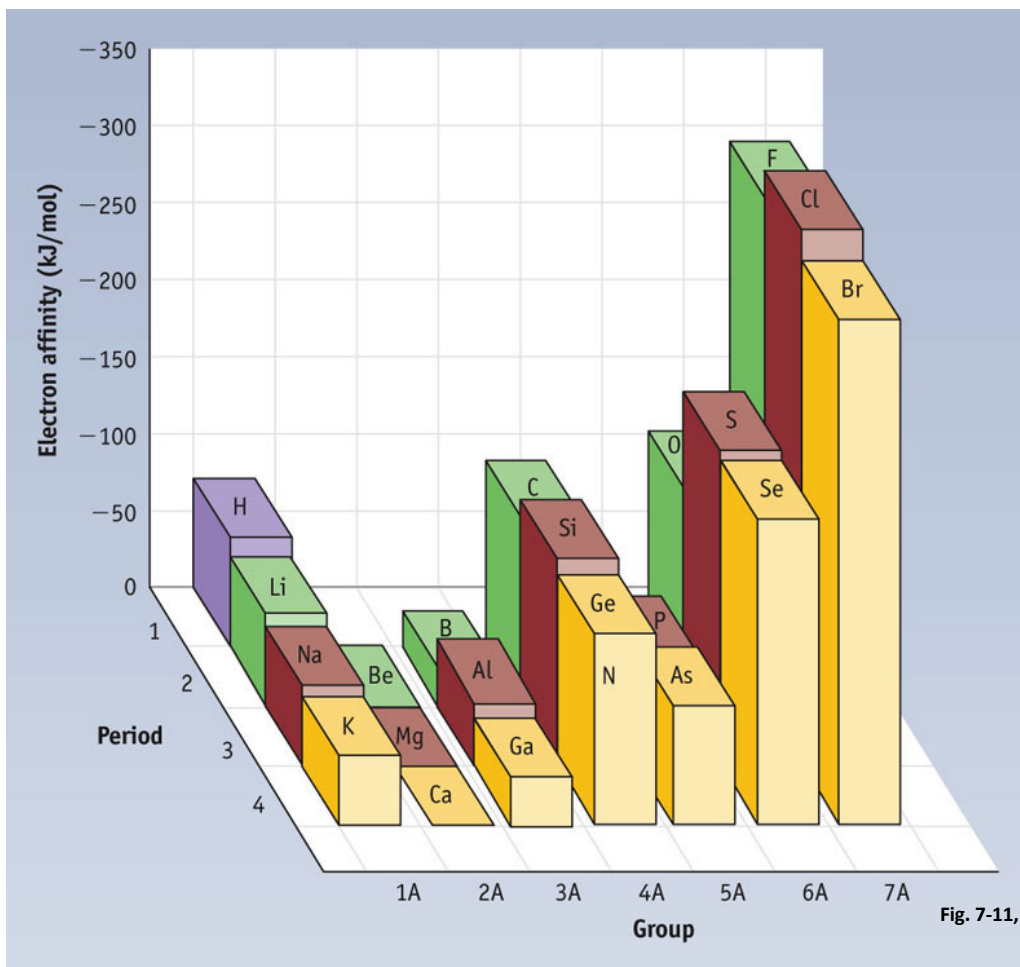
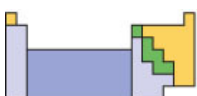
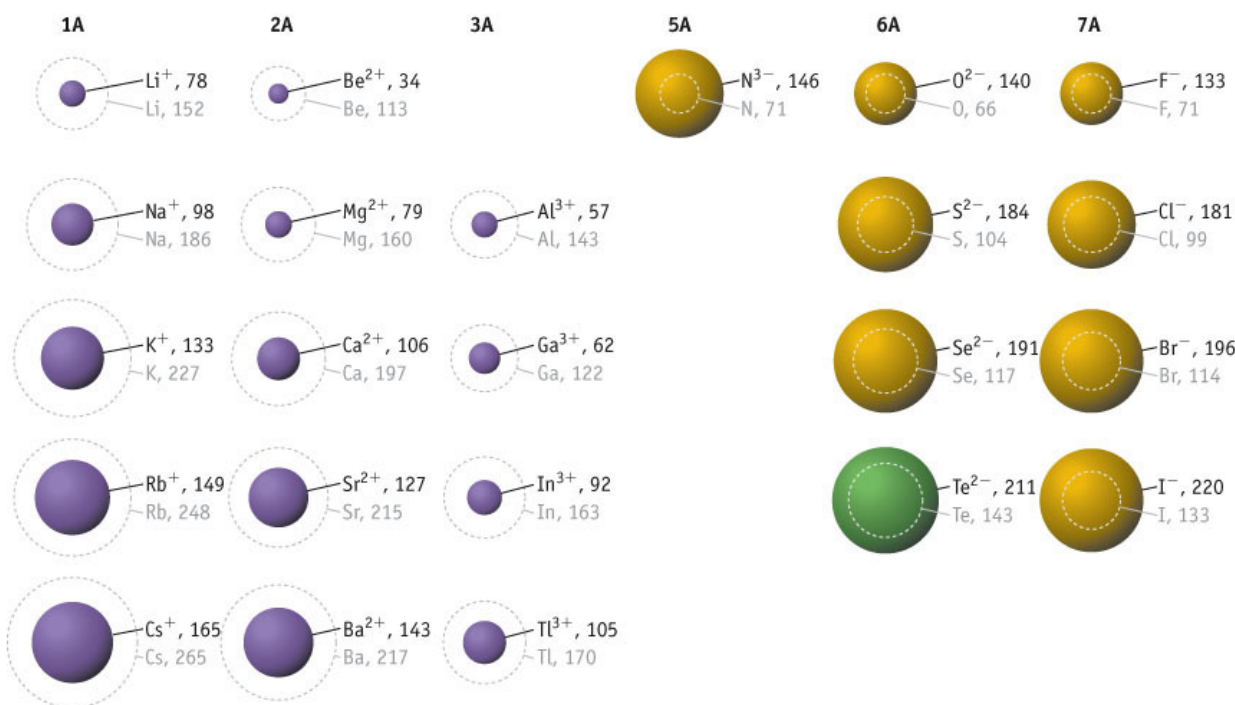


Fig. 7-11, p. 324





Main Group Metals  
 Transition Metals  
 Metalloids  
 Nonmetals



© Brooks/Cole, Cengage Learning

Fig. 7-12, p. 326