

Number of valence electrons	Electron-dot notation	Example
1	X·	Na·
2	·X·	·Mg·
3	·X·	·B·
4	·X·	·C·
5	·X:	·N:
6	:X:	:O:
7	:X:	:F:
8	:X:	:Ne:

FIGURE 10 To write an element's electron-dot notation, determine the element's number of valence electrons. Then place a corresponding number of dots around the element's symbol, as shown.

Electron-Dot Notation

Covalent bond formation usually involves only the electrons in an atom's outermost energy levels, or the atom's valence electrons. To keep track of these electrons, it is helpful to use electron-dot notation. **Electron-dot notation** is an electron-configuration notation in which only the valence electrons of an atom of a particular element are shown, indicated by dots placed around the element's symbol. The inner-shell electrons are not shown. For example, the electron-dot notation for a fluorine atom (electron configuration $[\text{He}]2s^22p^5$) may be written as follows.



In general, an element's number of valence electrons can be determined by adding the superscripts of the element's noble-gas notation. In this book, the electron-dot notations for elements with 1–8 valence electrons are written as shown in **Figure 10**.

SAMPLE PROBLEM B

For more help, go to the *Math Tutor* at the end of this chapter.

- Write the electron-dot notation for hydrogen.
- Write the electron-dot notation for nitrogen.

SOLUTION

- A hydrogen atom has only one occupied energy level, the $n = 1$ level, which contains a single electron. Therefore, the electron-dot notation for hydrogen is written as follows.



- The group notation for nitrogen's family of elements is ns^2np^3 , which indicates that nitrogen has five valence electrons. Therefore, the electron-dot notation for nitrogen is written as follows.



Lewis Structures

Electron-dot notation can also be used to represent molecules. For example, a hydrogen molecule, H_2 , is represented by combining the notations of two individual hydrogen atoms, as follows.

