

Chapter 15 HW Answers

Review Questions:

2. Valence electrons, the outermost electrons, are represented by the electron dot structure.
3. Electron-dot structures are exactly the **same** for elements within a particular group.
7. Fluorine has 7 electrons in the outermost shell, leaving only one unpaired electron, so fluorine only needs one electron to fill the shell.
9. Groups IA and IIA tend to combine with groups VIA, and VIIA to form ionic compounds.
10. Charge = **+2**. Calcium (Ca) loses two electrons, one to each Chlorine (Cl) atom.
16. Non-metals tend to form covalent bonds.
17. Shared electrons = **4**.
21. The Carbon-Oxygen bond is more polar than the Carbon-Nitrogen bond, following the general rule.
25. Water molecules are so strongly attracted to each other, that water prevents the oil from being distributed among the water molecules.
27. A chemical bond forms a new substance a molecular attraction does not.

Exercises:

3. The loss of an electron is a **physical change** because the atom will retain its chemical properties which are based on the number of protons.
4. MgCl_2
5. Ba_3N_2
7. SO_4^{-2}
9. The K atom is larger than the K^+ atom because size is determined by the size of electron orbits.
15.

O with F	Polar Covalent
Ca with Cl	Ionic
Na with Na	Non-polar covalent
U with Cl	neither
18. H_3P

20. O – H Most Polar
 H – N
 C – H
 C – O
 N – C
 C – C Non-polar
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21. $O=C=S$ is the only one that is polar.

23. N – N least polar
 N – O
 N – F
 N – H most polar

27. Water is a dipole with strong hydrogen bonding molecular attractions; this makes the boiling point of water very high.

33. The water molecule is more attracted to a sodium ion. Ion-dipole attractions are the strongest.

Additional:

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| 1. | | |
| a. | Allows material to conduct electricity | metallic |
| b. | Electrons are shared among all nuclei | metallic |
| c. | There is a transfer of electrons | ionic |
| d. | The chemical bond is due to the electric force | ionic |
| e. | Electrons are shared between two atoms | covalent |
| f. | A polar bond is formed | covalent |
| g. | NaCl | ionic |
| h. | O ₂ | covalent |

2. Molecular attractions cause surface tension.