

Review # 4: Bonding

1. What is meant by stable octet?
2. What is the reason for the stability of the noble gases?
3. What type of elements are involved in ionic bonding?
4. During the formation of ionic bonds, which noble gas does each of the following become isoelectronic: a) beryllium, b) aluminum, c) potassium, d) sulfur, e) fluorine?
5. Using ion charges show how potassium and oxygen bond.
6. Using three equations show how barium and oxygen bond.
7. Assuming that the following elements combine to form ionic compounds, write the chemical formula and draw the Lewis structure: a) Al and S, d) Ca and N.
8. Why do ionic compounds tend to have high melting points?
9. What is the main difference between an ionic bond and a covalent bond?
10. Draw the Lewis structure for IBr. Is the bond between the iodine and the bromine polar? If it is, which end of the molecule is slightly negative?
11. Draw the Lewis structure for IAt. Is the bond between the iodine and the astatine polar? If it is, which end of the molecule is slightly negative?
12. Which, in each of the following pairs of bonds, is more polar: a) Si-Cl or P-Cl; b) O-F or S-O; c) Se-Cl or H-Se?
13. What is a molecule? Using examples, distinguish between a molecule and an ion.
14. Predict the most probable type of bonding (ionic or covalent) found in each of the following:
 - a) a substance that melts at relatively low temperatures
 - b) a substance that boils at relatively high temperatures
 - c) a hard but brittle substance
 - d) a substance that is made up of molecules
15. Draw the Lewis structures for a) SnH_4 ; b) NF_3 ; c) TeCl_2 ; d) CH_5N ; e) HOBr .
16. Draw the Lewis structure for the OH^- ion.
17. Draw Lewis structures for a) Cl_2O ; b) SiH_4 ; c) H_2Se ; d) CCl_4 . Use VSEPR Theory to predict the shapes of these molecules. Are these molecules polar or nonpolar?
18. What intermolecular forces would be present in the molecules in question 18?
19. Draw the Lewis structure for the ClO^- ion and the ClO_2^- ion. Which of these ions has a coordinate covalent bond?
20. Explain why metals are malleable.