Chemical Bonding

Lewis Theory of Bonding

* Atoms and ions are stable if they have a noble gas-like electron configuration (stable octet)
* Electrons are most stable when they are paired
* Atoms form chemical bonds to achieve a stable octet of electrons
* A stable octet may be achieved by an exchange of electrons between metal and non-metal atoms
* A stable octet of electrons may be achieved by the sharing of electrons between non-metal atoms
* The sharing of electrons results in a covalent bond

Lewis Dot Diagrams

1. From the molecular formula given, determine how many valence electrons are available from all atoms present in the molecular formula. Calculate the total.
2. Add one valence electron for each negative charge. Subtract one valence electron for each positive charge.
3. Decide on the central atom for the molecule. Generally the one with the highest valency. If two possible then the one with the lowest electronegativity.
4. Place other atoms symmetrically around central atom.
5. Attach all atoms to central atom with a pair of valence electrons.
6. Then complete the octets around the outside atoms. Rest of electrons will go around the central atom.
7. If left over electrons, look for possible multiple bonding.
8. If there are not enough electrons, convert non-bonding pairs into bonding pairs.
9. If #7 or #8 cannot be achieved then assume that is an exception to the octet rule.
10. Lewis structures use a dash to show a covalent bond.
11. Watch for oxyacids, H and O are attached together.