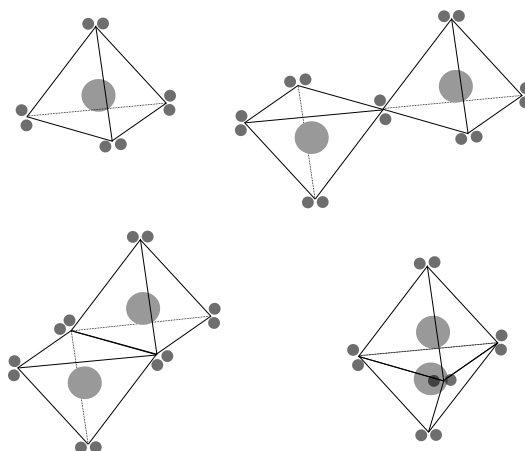


The Two-Electron Bond

Skills to Develop

- Describe Lewis' theory for bonds between atoms

The facts described in the [previous](#) section, that almost all molecules have all their electrons paired, lead Lewis to the conclusion that **electron pairs** are of central importance in chemistry. He proposed that in atoms, and especially in molecules, electrons are usually paired. He proposed this theory a little after Bohr's theory of quantum mechanics, which proposed orbits for electrons, and thought that 2 electrons could fit in each orbit. Lewis imagined that when 2 H atoms form a molecule, the 2 electrons would share an orbit "between" the 2 atoms. He didn't talk about what the orbits would really look like, but he did propose that the electrons could be imagined as sitting on the corners of tetrahedra. When atoms made bonds, they could share electrons on the points of the tetrahedra, as shown. Thus they could make single, double or triple bonds (such as in F_2 , O_2 and N_2).



Lewis' idea of electron pairs on the vertices of tetrahedra, including a single atom, and single, double and triple covalent bonds. Electron pairs are shown as small grey dots and nuclei as large grey dots.

In Lewis' theory, there is no fundamental difference between covalent and ionic bonding. (Actually, he invented the idea of covalent bonding, while Langmuir invented the word "covalent," but it had been known for a while that molecules made of only non-metals had different properties from those made of metals and non-metals together). Electrons can be shared between atoms, and the sharing is more equal if the atoms are similar or the same, and more unequal if the atoms are different. Two shared electrons make one chemical bond.

Outside Link

- [CrashCourse Chemistry: Atomic Hook-ups](#) (10 min)

Contributors and Attributions

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