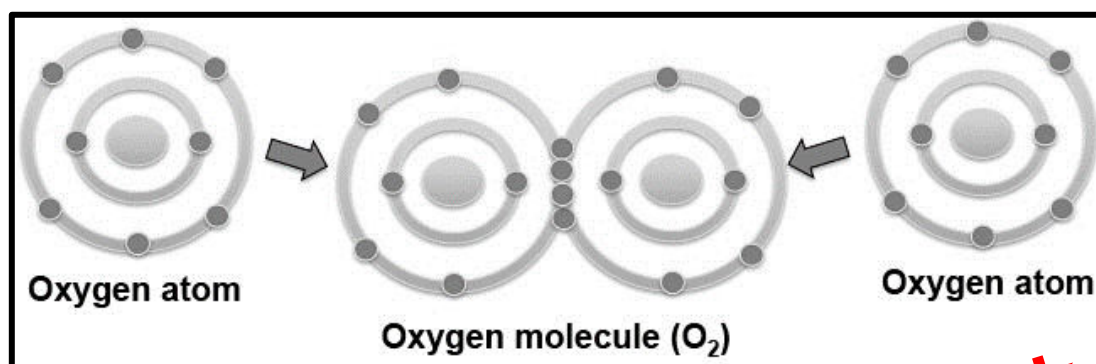


The Octet Rule, Electronegativity, Bonding and Molecular Orbitals

- The bonds in compounds are formed during the redistribution of valence electrons
 - **Protons and neutrons never participate in bonding**
 - The most stable atoms have full valence shells
 - Only a few elements exist with full shells, **the noble gases**
 - This is why they are **highly unreactive**
- A compound has a much more stable distribution of atoms compared to separate atomic components
 - In oxygen for example, 2 electrons are shared from each oxygen atom's valence shell to fill both, as seen here:



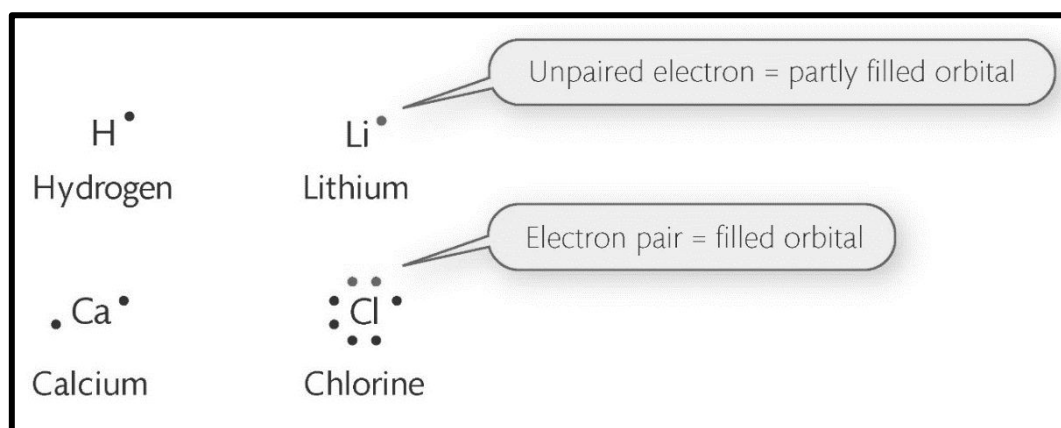
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full valence shell, because of this, only 8 electrons are needed for any given shell

- **The Octet Rule states that an atom seeks to gain a full valence shell with 8 electrons**
 - Exceptions to this are **H (1e⁻)** and **He (2e⁻)**
- A valence shell can be represented using **Lewis Dot Symbols**
 - This is a series of dots that surround the chemical symbol
 - The dots are placed on the **four sides of the symbol to show the 4 orbitals (1s and 3p)**
 - When adding dots to show a bond, the **free spaces are filled up first, then the space next to it**
 - The following is a diagram of some Lewis dot symbols:



- **Covalent bonds are when one or more pairs of electrons are shared equally between atoms** whereas an **ionic bond is when one or more electrons is transferred to another atom**