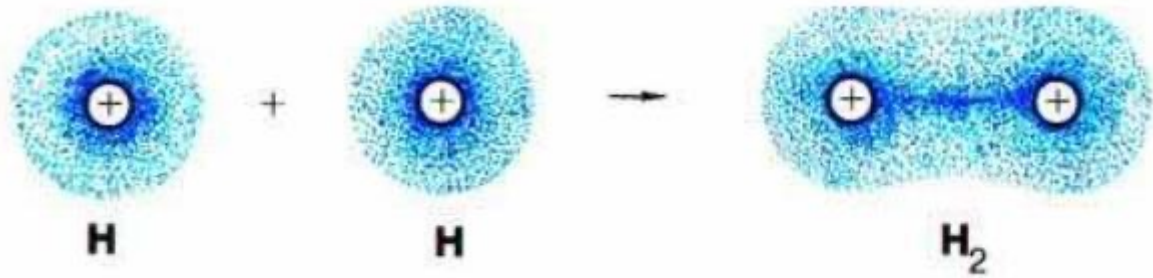


All chemistry is fundamentally electrical in nature

Common Ions

1 H ⁺¹																	2 He	
3 Li ⁺¹	4 Be ⁺²																	10 Ne
11 Na ⁺¹	12 Mg ⁺²																	18 Ar
19 K ⁺¹	20 Ca ⁺²	21 Sc ⁺³	22 Ti [*]	23 V [*]	24 Cr [*]	25 Mn [*]	26 Fe [*]	27 Co [*]	28 Ni [*]	29 Cu [*]	30 Zn ⁺²	31 Ga ⁺³	32 Ge [*]	33 As	34 Se	35 Br ⁻¹	36 Kr	
37 Rb ⁺¹	38 Sr ⁺²	39 Y ⁺³	40 Zr ⁺⁴	41 Nb ⁺⁵	42 Mo [*]	43 Tc [*]	44 Ru [*]	45 Rh [*]	46 Pd [*]	47 Ag ⁺¹	48 Cd ⁺²	49 In [*]	50 Sn [*]	51 Sb [*]	52 Te	53 I ⁻¹	54 Xe	
55 Cs ⁺¹	56 Ba ⁺²	71 Lu ⁺³	72 Hf ⁺⁴	73 Ta [*]	74 W [*]	75 Re [*]	76 Os [*]	77 Ir [*]	78 Pt [*]	79 Au [*]	80 Hg [*]	81 Tl [*]	82 Pb [*]	83 Bi [*]	84 Po	85 At ⁻¹	86 Rn	
87 Fr ⁺¹	88 Ra ⁺²	103 Lr	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Mt	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og	
		57 La ⁺³	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb			
		89 Ac	90 Th	91 Pa	92 U [*]	93 Np [*]	94 Pu [*]	95 Am [*]	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No			

Lewis structures

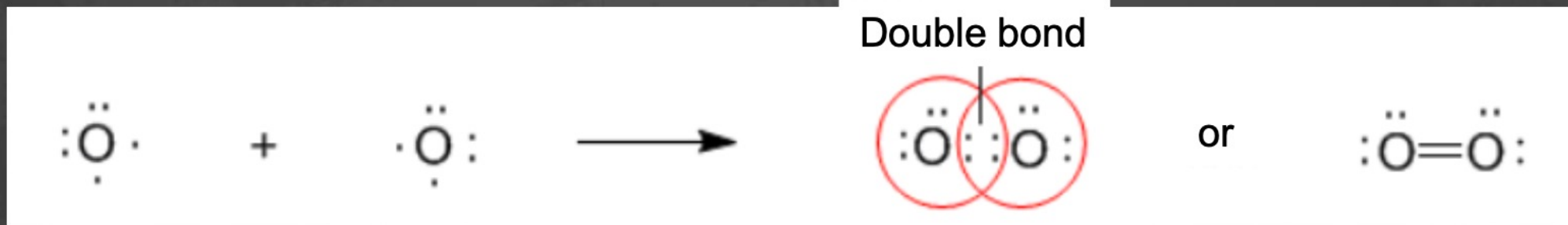


Atoms form chemical bonds by combining such number of electrons that allows them to obtain an electron configuration of noble elements

- Hydrogen binds into a molecule resulting in the electron configuration of helium (1s²)
- Oxygen combines into a molecule with the electron configuration of argon (...3s²3p⁶). Each atom now has 8 electrons.

Multiple bonds

- If the octet rule requires multiple bonds can form between two atoms (each bond is two shared electrons)
 - These bonds are called double or triple bonds
- E.g. oxygen can form a molecule from two oxygen atoms only when there are two shared electron pairs between the atoms:



Each oxygen atom has 6 electrons

Each oxygen atom has 8 electrons

Structural formulas identify the location of chemical bonds between the atoms of a molecule.

A structural formula consists of symbols for the atoms connected by short lines that represent chemical bonds—one, two, or three lines standing for single, double, or triple bonds, respectively.

Multiple bonds

Bond	Bond length ($\text{Å}=10^{-8} \text{ cm}$)	Bond strength, kJ
Single (N-N)	1.45	58.5
Double (N=N)	1.25	456
Triple (N \equiv N)	1.098	945

Bond order is the number of chemical bonds (shared electron pairs) between a pair of atoms and the bond stability. The highest bond order is 3.

Some general rules to work out Lewis structures.

Outer atoms have 8 electrons in its outer shell (except hydrogen, it should have two). This is done by using single, double, or triple bonds, it also could be + or – charges.

If the central atom is from period 2 it should have no more than 8 electrons in its outer shell. It should have a noble gas configuration (not always).

If the central atom is from period 3 it may have up to 18 electrons in its outer shell.