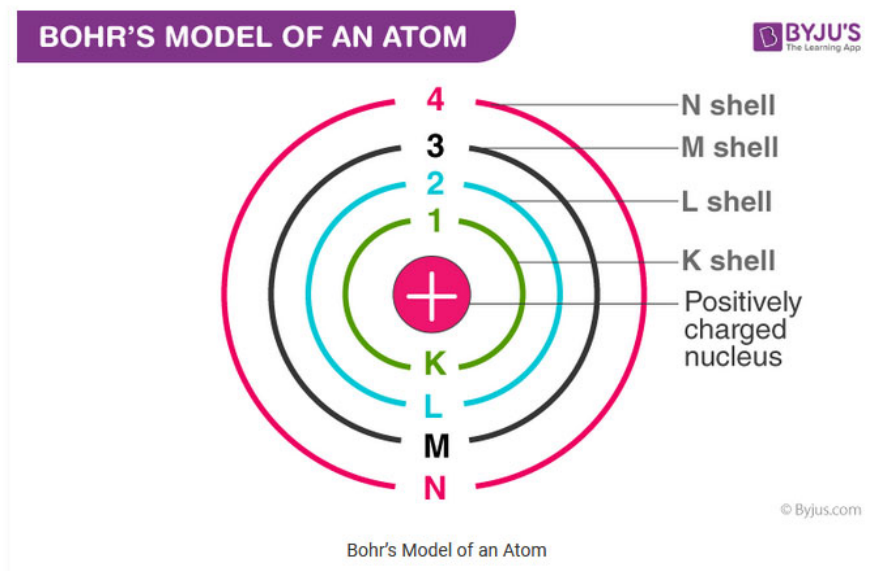


Ch. 8.1 Lewis symbols & Octet rule

review: Bohr model of an atom



- * inner shell / core electrons
- * **valence electrons**
outer-most shell of electrons
involved in chemical reactions
involved in chemical bonds

source: <https://byjus.com/chemistry/bohrrs-model/>



Lewis symbols

- use chemical symbols to represent an atom
- use dots (or cross / x) to represent valence electrons

examples:

Table 8-1

Electron-Dot Structures								
Group	1A	2A	3A	4A	5A	6A	7A	8A
Diagram	Li·	·Be·	·B·	·C·	·N·	·O·	·F·	·Ne·

source: <https://vdocuments.site/glencoe-chemistry-matter-and-change.html>



Ocet rule

- noble (or inert (i.e. unreactive)) gas (except He) has 8 valence electrons
implies that an atom with 8 valence electrons are stable / unreactive / "happy"
- atoms "want" to have 8 valence electrons
exception: hydrogen is "happy" with 2 valence electrons – like He



Ch. 8.2 ionic bonds

example:

electron configuration

Na : [Ne] 3s → 1 valence electron

Cl: [Ne] 3s² 3p⁵ → 7 valence electrons

note: if there's a transfer of a valence electron from Na to Cl,

i.e. Na loses an electron → cation with a charge of + 1

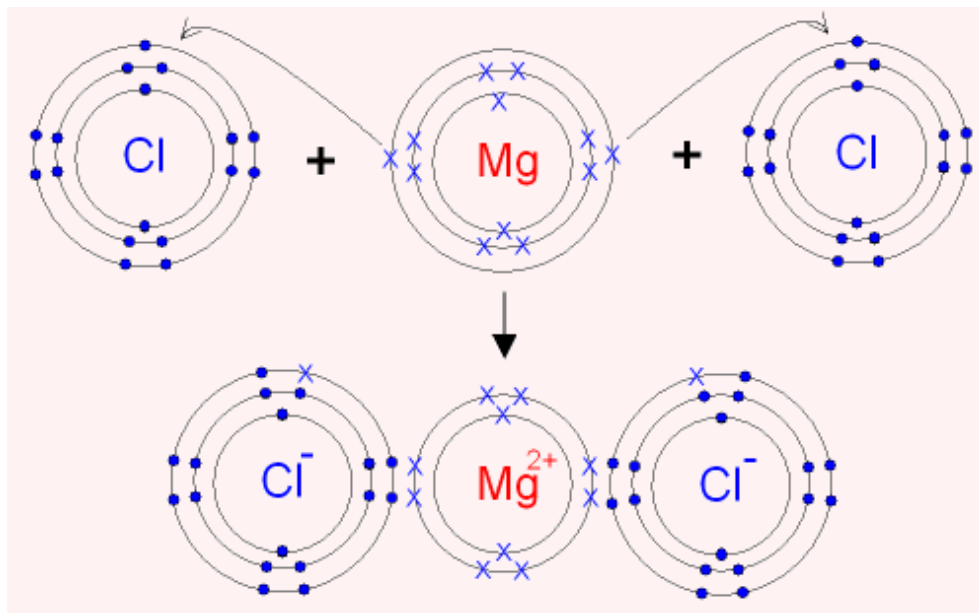
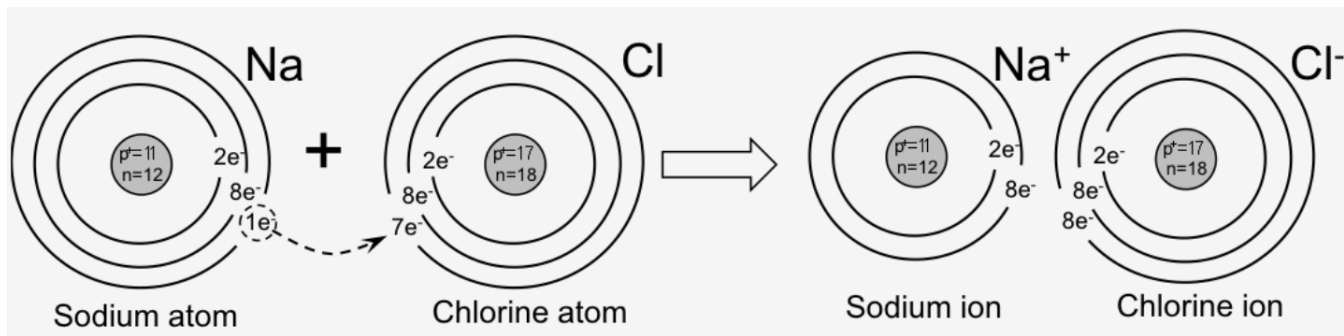
Cl gains an electron → anion with a charge of - 1

both species would satisfy the Octet rule.

cation & anion attract each other = ionic bond

which involves the transfer of electrons

alternative perspective – ionic bond: use Bohr model



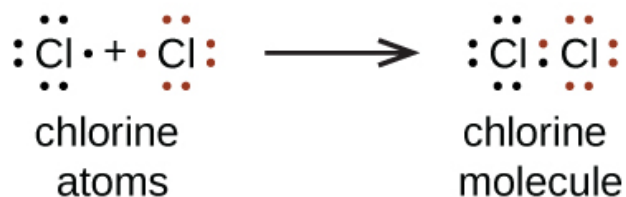
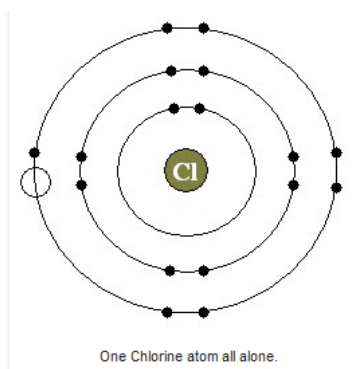
sources:

<http://thebiologyprimer.com/intro-to-biochemistry> (top)

<https://www.gcscience.com/a9-reaction-magnesium-chlorine.htm> (left)

Ch. 9.1 covalent bonds

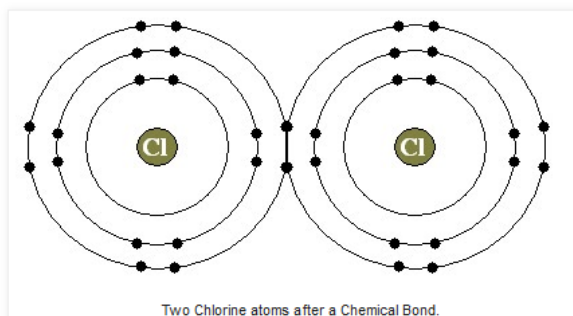
Unlike ionic bonds, which involves transfer of electrons, covalent bonds involves sharing of (valence) electrons.



sources:

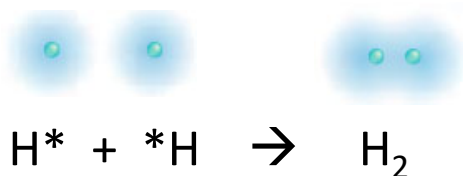
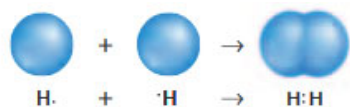
<http://scientia-biology.blogspot.com/2013/03/chapter-2-composition-and-chemistry-of.html> (left)

<https://openstax.org/books/chemistry-2e/pages/7-3-lewis-symbols-and-structures> (top)



Valence bond (VB) theory - covalent bonds

involves overlap of atomic orbitals (or hybrid orbitals)



overlap: region in space between nuclei in bond, where shared electrons are located.

basis of covalent bond: mutual attraction between shared electrons and nuclei of adjacent atoms in the “bond”.

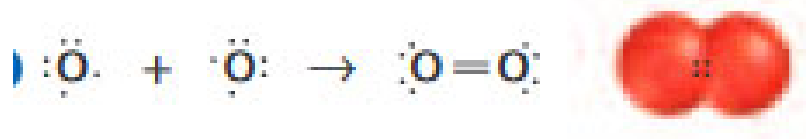
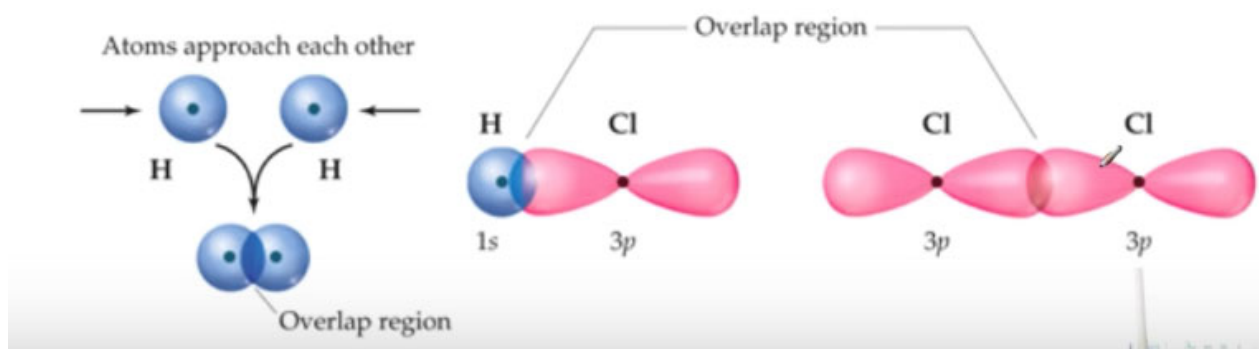


image source: <https://vdocuments.site/glencoe-chemistry-matter-and-change.html>

continue – VB theory

involves overlap between:



s-AO – s-AO

s-AO - p-AO

p-AO – p-AO

source: https://www.youtube.com/watch?v=7SWzTe9Cc10&feature=emb_logo