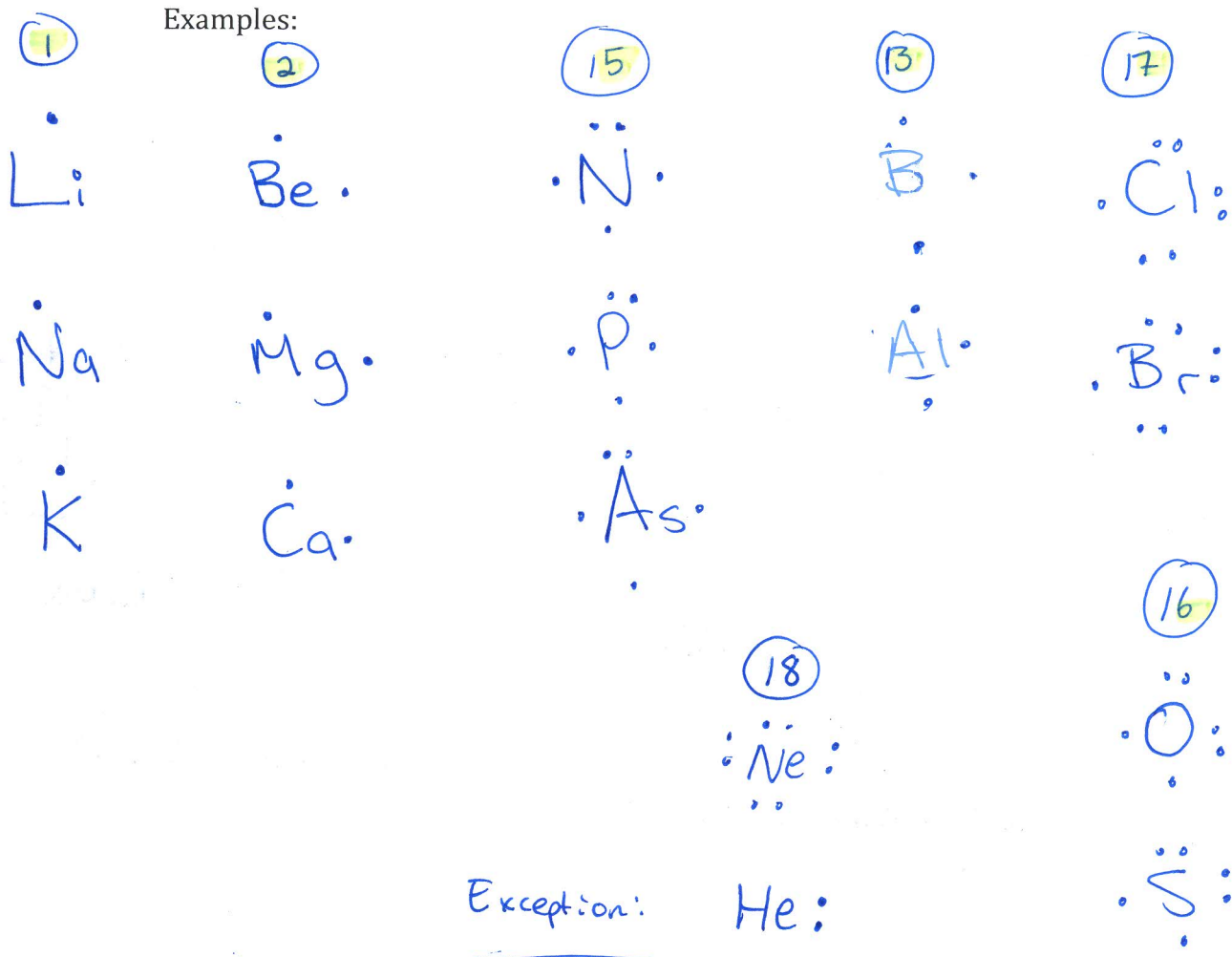


Electron Dot Diagrams/Lewis Dot Diagrams

American chemist G.N. Lewis invented these structures to visualize and track during bond formation.

- 1) write its chemical symbol
- 2) surround it by the number of dots that represent the atom's valence electrons → group #
- 3) if an atom has more than 4 valence electrons, the additional electrons are shown paired with others
- 4) note that elements in the same group will have identical dot diagrams since they have the same number of valence e-

Examples:



Formation of Ions

Any atom or group of atoms that either loses or gains e^- and thus carries either a positive or negative charge is called an *ion*.

- Cation - positive charge (has fewer e^- than p^+)
 - metallic ions (due to loss of e^-)
 - cats have paws.



- Anion - negative charge (has more e^- than p^+)
 - non metallic ions
(due to gain of e^-)

Formation of Ionic Compounds

Ions do not form by themselves.

Instead, as metallic and non-metallic atoms collide with one another, their valence electrons interact.

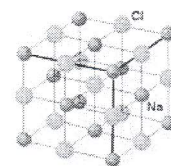
The metal will lose its valence electrons (becoming the cation) and an adjacent non-metal will gain those electrons (the anion); this is a transfer of electrons. The two ions formed are opposite in charge and are greatly attracted to each other, forming a very strong

* DEMO
2 students
and
signs


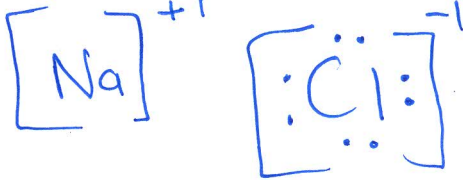
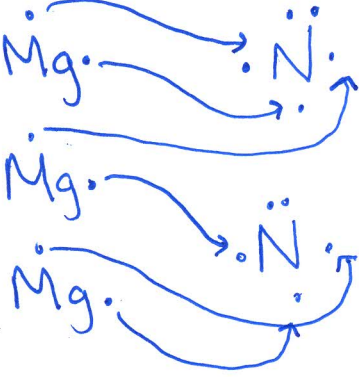
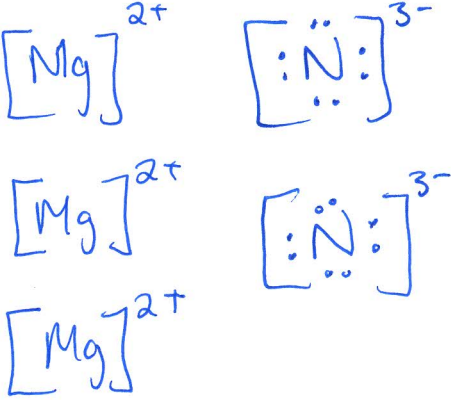
Ionic bond.

The rearrangement of electrons allows each ion a full valence orbital (like its nearest noble gas) and therefore leads to a greater stability and lower energy level for the ionic compound.

- ions arrange themselves in a regular repeating pattern called a crystal lattice
- properties: hard, brittle, solids at room temp
conduct electricity.
- a binary ionic compound is formed from only 2 elements.



Examples:

metal atom & non-metal atom	Electron dot diagram showing exchange of electrons	Electron dot diagram of new ions formed (include the charges)	New Ionic compound formed
sodium & chlorine			NaCl
magnesium & nitrogen			Mg ₃ N ₂