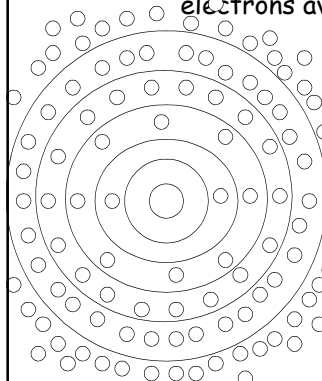


How do we know if an atom has electrons available for bonding?



Look at how many **ELECTRONS** are in each **SHELL**

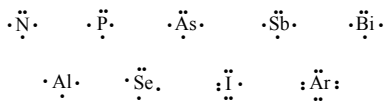
- Shell 1 can hold 2 (2X1)
- Shell 2 can hold 8 (2X4)
- Shell 3 can hold 18 (2X9)
- ◐ Shell 4 can hold 32 (2X16)
- Shell 5 can hold 50 (2X25)

Lewis Dot Structures

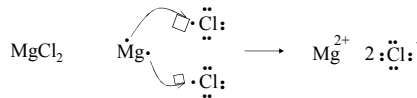
- **Lewis dot structure**- a symbol in which the electrons in the outer shell of an atom or ion are represented by dots placed around the chemical symbol of the element.

Lewis Symbols

- A chemical symbol represents the nucleus and the *core e*.
- Dots around the symbol represent *valence e*.



Lewis Structures for Ionic Compounds



Writing Lewis Structures

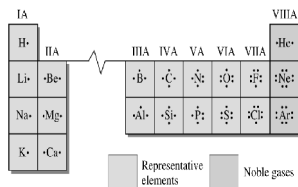
- *All* the valence e of atoms must appear.
- *Usually*, the e are paired.
- *Usually*, each atom requires an octet.
 - H only requires 2 e .
- Multiple bonds may be needed.
 - Readily formed by C, N, O, S, and P.

Drawing Electron Dot Structures

1. Determine the number of Valence electrons
2. Write the symbols of the atoms and arrange in a way where they are bonded to each other using a covalent bond (dash)
3. Add non-bonding electrons (dots) so that each atom bonding to the central atom has an octet
4. Place any remaining electrons on the central atom
5. If the central atom does not have an octet, rearrange electrons to form additional bonds
6. Count the electrons make sure they are the same in the Valence electrons available in step 1

Valence Electrons and Electron Dot Structures

- Representative elements in the same group of the periodic table have the same number of valence electrons.
 - That number is the same as the group number.
- The maximum number of valence electrons is 8.
 - Elements with 8 electrons are non-reactive Noble Gases.



The Octet Rule

- Common feature of Noble Gases is the electron configuration of the outermost s and p orbitals, which are filled with 8 valence electrons.
- In forming compounds, each atom wants to share electrons in such a way to produce a noble gas configuration
 - (note: there are some exceptions)
- Two ways of being an octet
 - Lose or gain an electron (ionic bond)
 - Sharing of electrons (covalent bond)
