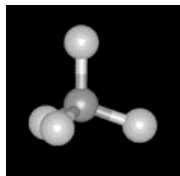


VESPR Theory



Molecular Structure

- Molecular structure – _____
arrangement of atoms in a molecule

VSEPR Theory

- VSEPR Theory

- The structure around a given atom is determined by minimizing the

- The electrons and elements bonded to the central atom want to be
_____ as possible

VSEPR Steps

1. Draw the Lewis structure for the molecule
2. Count the total number of things that are around the central atom to determine the **electron pair geometry**
3. Imagine that the lone pairs of electrons are invisible and describe the molecular shape

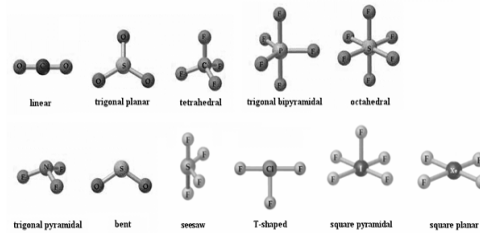
SORRY...

- Yes...you must memorize the main shapes and bond angles



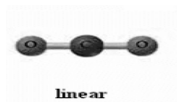
Summary VSEPR and Hybridization Table

| Electron Domains | Electron Domain Geometry | Predicted Bond Angle(s) | Hybridization of Central Atom | Molecular Geometry | | |
|------------------|--------------------------|-------------------------|--------------------------------|----------------------|--------------------|---------------|
| | | | | 0 Lone Pair | 1 Lone Pair | 2 Lone Pair |
| 2 | Linear | 180° | sp | Linear | | |
| 3 | Trigonal Planar | 120° | sp ² | Trigonal Planar | Bent | |
| 4 | Tetrahedral | 109.5° | sp ³ | Tetrahedral | Trigonal Pyramidal | Bent |
| 5 | Trigonal Bipyramidal | 90°, 120° | sp ³ d | Trigonal Bipyramidal | Seesaw | T-shaped |
| 6 | Octahedral | 90° | sp ³ d ² | Octahedral | Square Pyramidal | Square Planar |



2 Electron Pairs

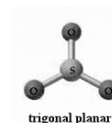
- If there are 2 things attached to the central atom, the shape is linear



- Bond angle = 180°

3 Electron Pairs

- If there are 3 electron pairs the shape will be trigonal planar



- Bond angle = 120°

3 electron pairs

- Now imagine that you have 3 electron pairs, but one is just a lone pair (invisible) what would it look like then?



bent

4 electron pairs

- If there are 4 electron pairs, the shape will be tetrahedral



tetrahedral

- Bond angle = 109.5°

4 electron pairs

- What if 1 of the electron pairs is a lone pair (invisible)? What would it look like then?

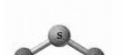


trigonal pyramidal

- Trigonal Pyramidal

4 electron pairs

- What if there are 2 lone pairs (invisible)? What would it look like then?



bent

- bent

5 electron pairs

- If there are 5 electron pairs the shape will be Trigonal Bipyramidal

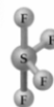


trigonal bipyramidal

- Bond angles = 90° & 120°

5 electron pairs

- What is there is 1 lone pair (invisible)



seesaw

- Seesaw

5 electron pairs

- What is there are 2 lone pairs (invisible)



T-shaped

- T-shaped

6 electron pairs

- If there are 6 electron pairs the shape will be octahedral



octahedral

- Bond angle = 90°

6 electron pairs

- What if there is 1 lone pair (invisible)?

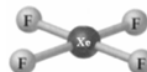


square pyramidal

- Square pyramidal

6 electron pairs

- What if there are 2 lone pairs (invisible)



square planar

- Square planar