

BONDING

Valence-Shell Electron-Pair Repulsion (VSEPR) Theory

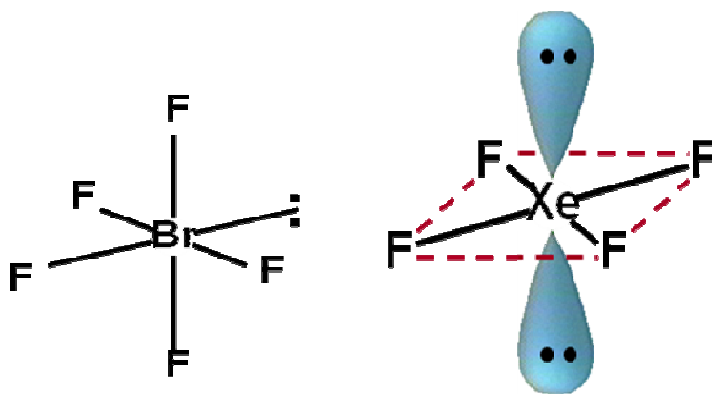
| Summary of Molecular Shapes | | | |
|------------------------------|------------------------|---------------------|--------------------|
| Total valence electron pairs | Electron Pair Geometry | Lone electron pairs | Shape of Molecule |
| 2 | ⇒ Linear | 0 | ⇒ Linear |
| 3 | ⇒ Trigonal planar | 0 | ⇒ Trigonal planar |
| | | 1 | ⇒ V-shaped |
| 4 | ⇒ Tetrahedral | 0 | ⇒ Tetrahedral |
| | | 1 | ⇒ Trigonal pyramid |
| | | 2 | ⇒ V-shaped |

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| Total valence electron pairs | Electron Pair Geometry | Lone electron pairs | Shape of Molecule |
|------------------------------|------------------------|---------------------|--------------------|
| 5 | ⇒ Trigonal bipyramidal | 0 | ⇒ Trig. bipyramid. |
| | | 1 | ⇒ See-saw |
| | | 2 | ⇒ T-shaped |
| | | 3 | ⇒ Linear |
| 6 | ⇒ Octahedral | 0 | ⇒ Octahedral |
| | | 1 | ⇒ Square pyramid |
| | | 2 | ⇒ Square planar |

Other molecules with 6 electron pairs.....

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MOLECULAR ORBITAL THEORY

Second row diatomic molecules

| NOTE SWITCH OF LABELS | B ₂ | C ₂ | N ₂ | O ₂ | F ₂ |
|---|----------------|----------------|----------------|----------------|----------------|
| E ↑ σ_{2p}^* π_{2p}^* π_{2p} σ_{2p} σ_{2s}^* σ_{2s} | — | — | — | — | — |
| | — — — | — — — | — — — | ↑ ↑ | ↑↓ ↑↓ |
| | — | — | ↑↓ | ↑↓ ↑↓ | ↑↓ ↑↓ |
| | ↑ ↑ | ↑↓ ↑↓ | ↑↓ ↑↓ | ↑↓ | ↑↓ |
| | ↑↓ | ↑↓ | ↑↓ | ↑↓ | ↑↓ |
| | ↑↓ | ↑↓ | ↑↓ | ↑↓ | ↑↓ |
| Magnetism | Para- | Dia- | Dia- | Para- | Dia- |
| Bond order | 1 | 2 | 3 | 2 | 1 |
| Bond E. (kJ/mol) | 290 | 620 | 942 | 495 | 154 |
| Bond length(pm) | 159 | 131 | 110 | 121 | 143 |