#### **School of Basic and Applied Sciences**

Course Code: BSCC2003 Course Name: Inorganic Chemistry II

**INERT PAIR EFFECT** 

### **PREREQUISITE**

P-block elements

Properties variation in p-block elements

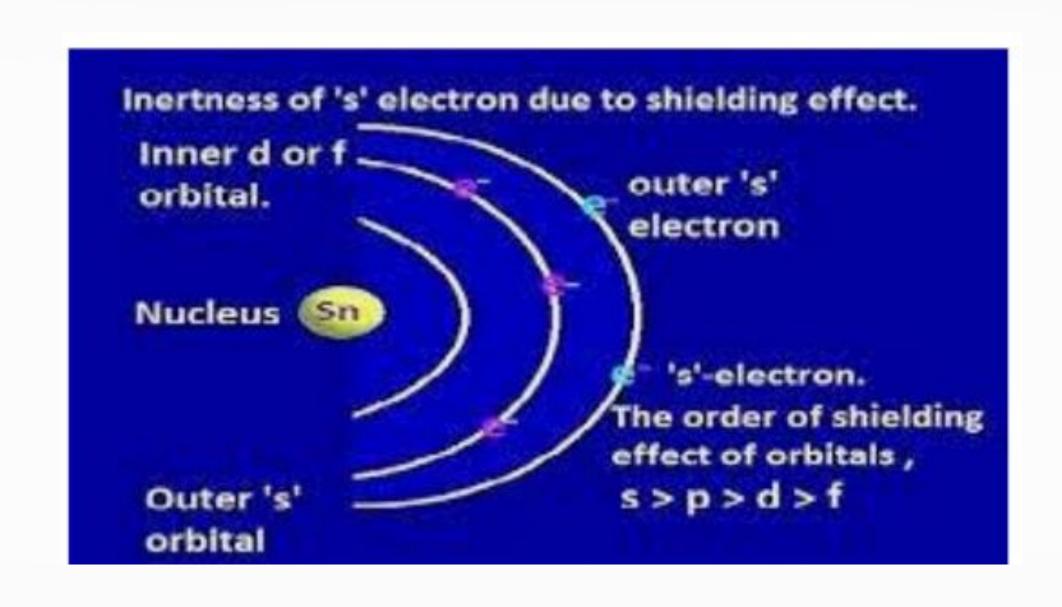
#### LEARNING OUTCOMES

Knowledge of various oxidation states in a group

Order of shielding effect

#### INERT PAIR EFFECT

- The term inert pair effect was first proposed by Nevil Sidgwick in 1927.
- The tendency occur among heavy elements in the p-block and is called the inert pair effect.
- Inert pair effect is the resistance or reluctance of s-electrons to get unpaired or take part in covalent bonding.
- It is only p orbitals electrons which are involved in bond formation.



• In term inert pair effect is often used in relation to the increasing stability of oxidation states that are two less than the group valency for the heavier elements of group 13,14,15,and16.

### Different Oxidation state

- Group 13 elements (Boron family)
- Group 14 elements (Carbon family)
- Group 15 elements (Nitrogen family)
- Group 16 elements (Oxygen family)

### **APPLICATION**

- . ELECTRONIC CONFIGURATION
- . ATOMIC RADII
- . IONISATION ENTHALPHY
- . ELECTRONEGATIVITY



#### REFERENCES

- Drago, R. S. (1958). Thermodynamic evaluation of the inert pair effect. *The Journal of Physical Chemistry*, 62(3), 353-357.
- Sanderson, R. T. (1986). The inert-pair effect on electronegativity. *Inorganic Chemistry*, 25(11), 1856-1858.
- Brill, T. B., Garrou, P. E., & Long, G. G. (1971). Halogen NQR spectroscopy in nonahalodiantimonate (III) ions, Sb2X93–, and it's implications regarding the "inert pair effect". *Journal of Inorganic and Nuclear Chemistry*, 33(10), 3285-3288.
- Hancock, R. D., Shaikjee, M. S., Dobson, S. M., & Boeyens, J. C. (1988). The Stereochemical activity or non-activity of the 'Inert'pair of electrons on lead (II) in relation to its complex stability and structural properties. Some considerations in ligand design. *Inorganica chimica acta*, 154(2), 229-238.

### THANK YOU