

## Module 3 : Organometallic chemistry of p-block elements

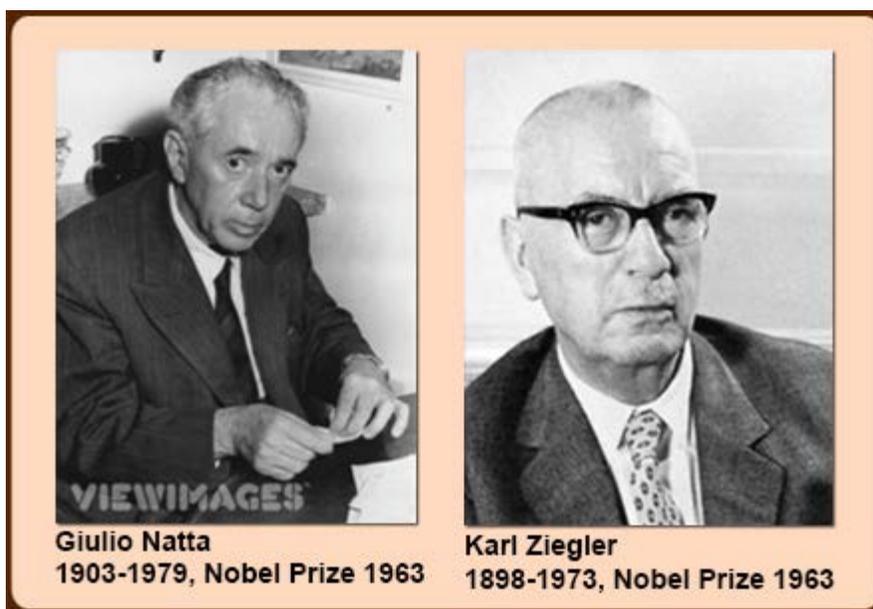
### Lecture 4 : Ziegler Natta polymerization catalysts

#### Objectives

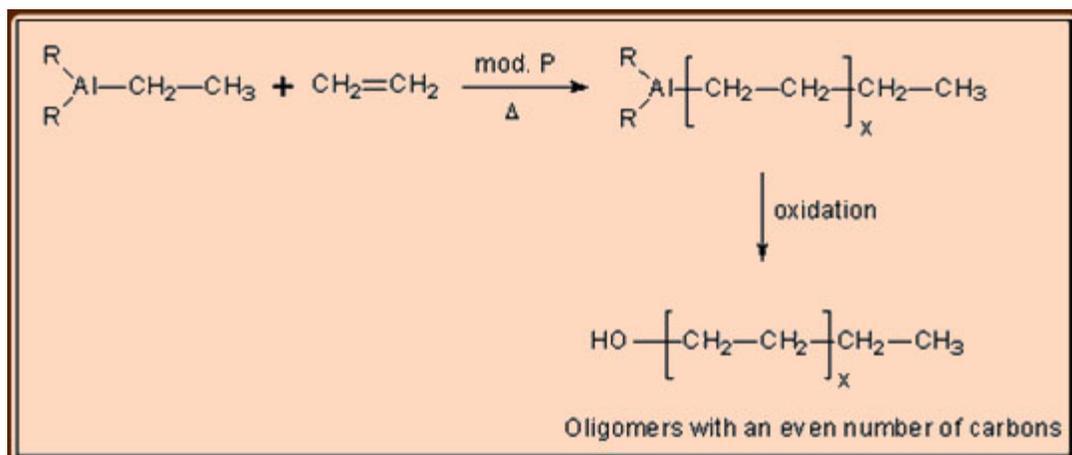
In this lecture you will learn the following

- Olefin polymerization.
- Mechanism involved in polymerization process.

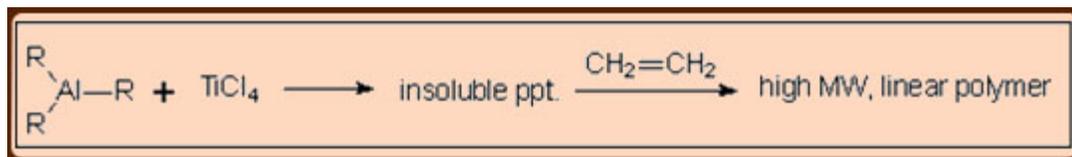
#### Ziegler Natta Polymerization Catalysts



Insertion of aluminum alkyls into olefins was studied by Ziegler. During the systematic investigation of olefin polymerization, Ziegler realized that the most effective catalyst is the combination of  $\text{TiCl}_4/\text{AlEt}_3$  which can polymerize ethylene at pressure as low as 1 bar. The application of Ziegler method to the polymerization of propylene and its establishment and the investigation of bulk properties was carried out by Natta and hence the methodology is called Ziegler-Natta process.



Important discovery:  $R_3Al + Lewis\ acids.$



In the absence of reaction mechanism with solid proof, it is presumed that the reaction is due to the heterogeneous catalysis in which fibrous  $TiCl_3$ , alkylated on its surface is considered to be the active catalyst species.

