



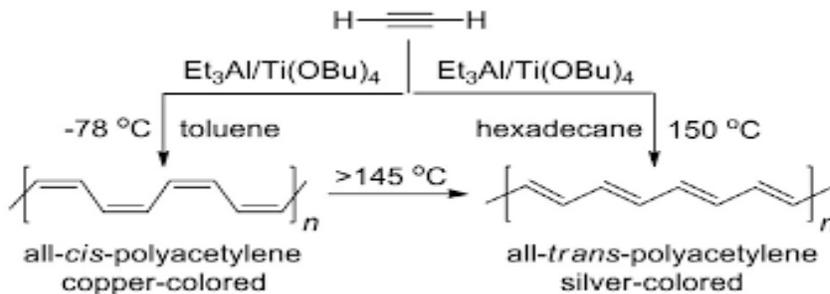
## Polyacetylene

### Preparation:

Polyacetylene or Polyethyne having a repeating unit  $(C_2H_2)_n$ , is a rigid, rod-like polymer that consists of long carbon chains with alternating single and double bonds between the carbon atoms.

The polyacetylene film forms at the gas-liquid interface when acetylene gas passes through a heptane solution of the Ziegler-Natta catalyst. Cis polymer forms at low temperature ( $-78\text{ }^\circ\text{C}$ ). Isomerization to the more stable trans form takes place on rising the temperature of the film. Conductivity of doped cis films is two or three times greater than the trans analogues.

There are two types of structure of Polyacetylene that is cis- and trans-polyacetylenes.



### Properties of Polyacetylene

1. Films of cis-polyacetylene are flexible and can be readily stretched while trans-polyacetylene is much more brittle.
2. Both cis and trans-polyacetylene show high thermal stability.
3. They are insoluble in common solvents.

### Applications:

1. Doped polyacetylene offers a particularly high electrical conductivity therefore it can be used in electric wiring or electrode material in lightweight rechargeable batteries.
2. Tri-iodide oxidized polyacetylene can be used as a sensor to measure glucose concentration.