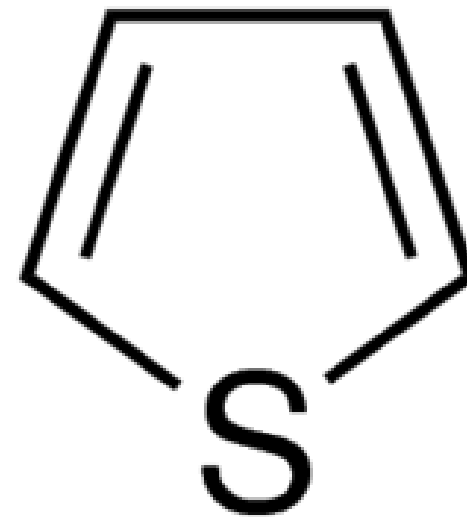


# Preparation and Properties of Thiophene

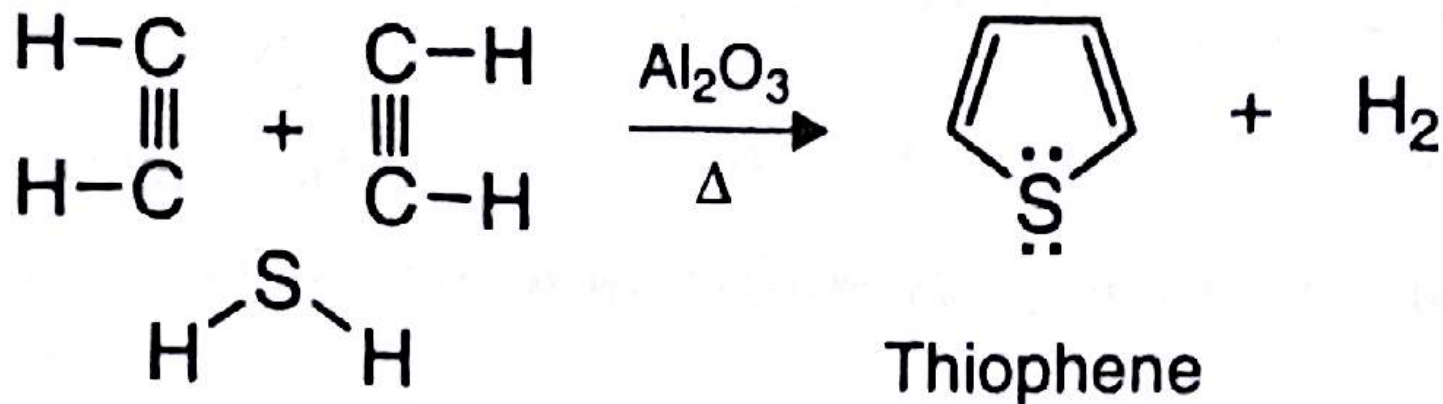
# Thiophene

- Thiophene is the sulphur containing counterpart of loran.
- It occurs in the light oil fraction of coat-tar and is usually present as an impurity in commercial benzene.
- The boiling points of thiophene and benzene are so close together that they cannot be separated by distillation.
- Thiophene may be separated from benzene by shaking the mixture with cold concentrated sulphuric acid.
- Best method of removing thiophene from benzene is by shaking with Raney nickel.

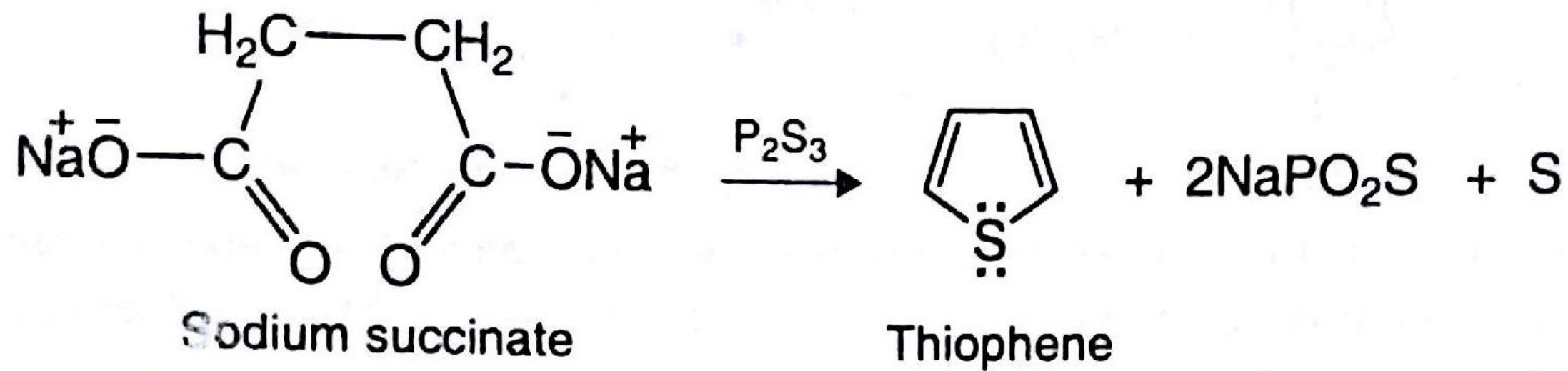


# Preparation Methods

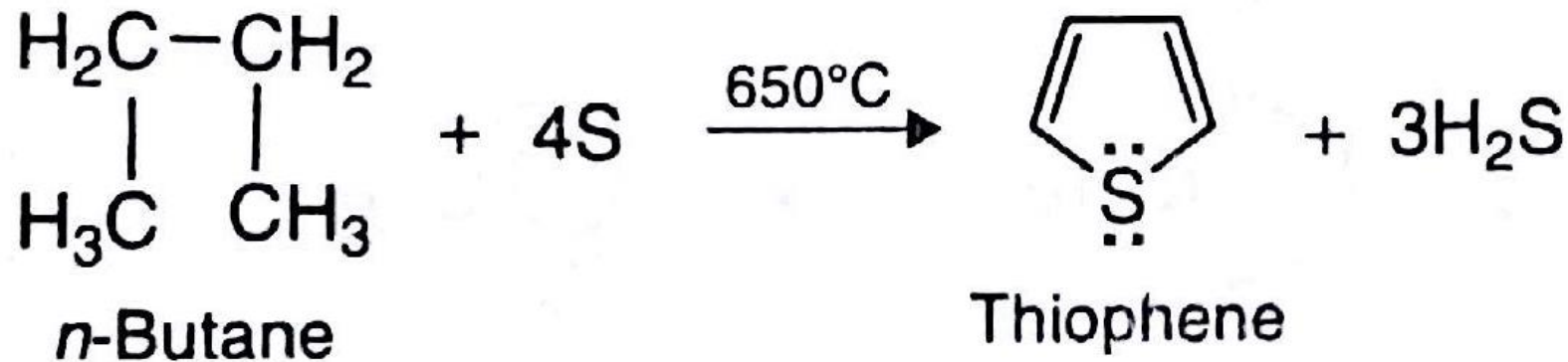
(1) By passing a mixture of acetylene and hydrogen sulphide through a tube containing aluminium oxide at 400°C.



(2) By heating sodium succinate with phosphorous trisulphide



(3) By the high-temperature (650 C) reaction of sulphur with butane.  
**(Commercial Method of Preparation).**



# Physical properties of Thiophene

Thiophene is a colourless liquid, boiling point 84 C, with an odour very similar to that of benzene. It is insoluble in water, but miscible with most organic solvents.

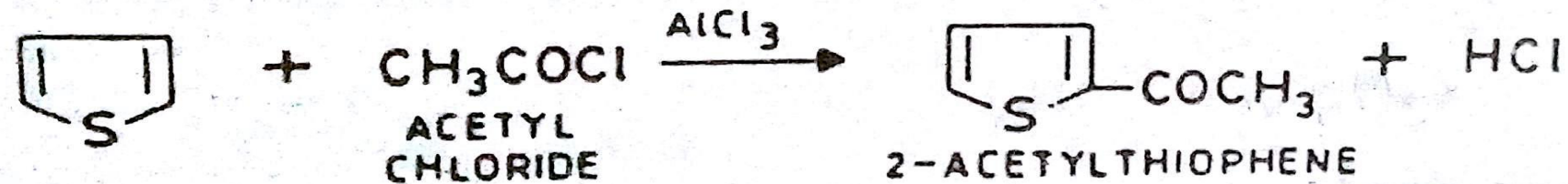
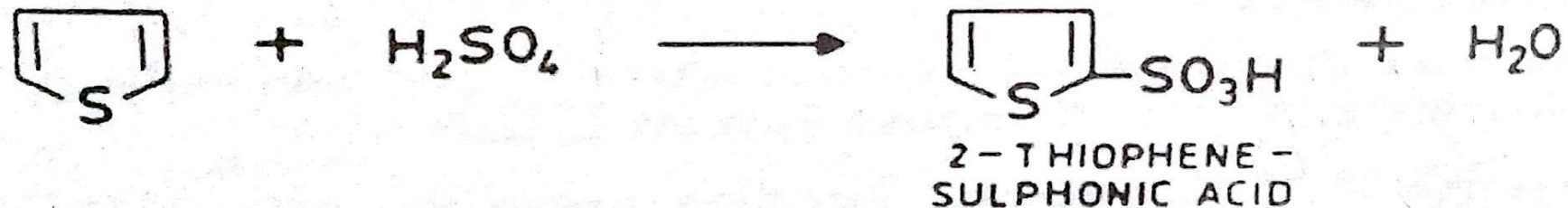
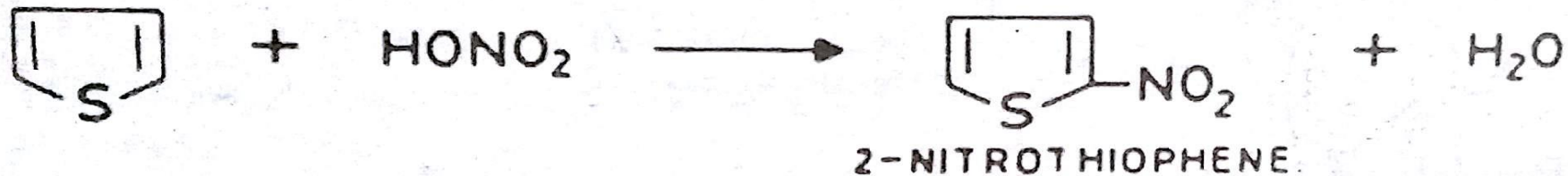
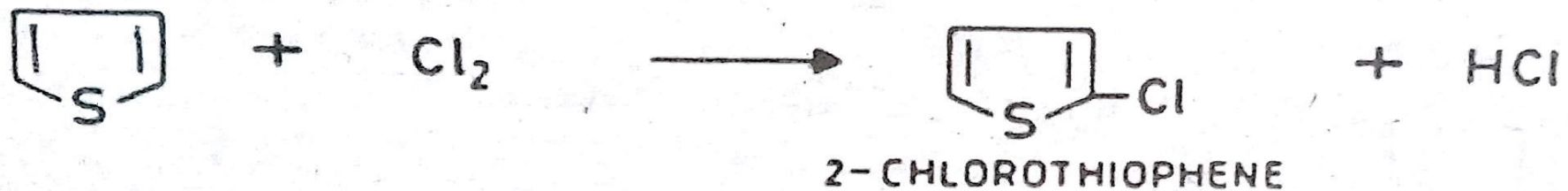
# Chemical properties of Thiophene

Thiophene is 300 times more reactive than benzene.

Thiophene does not show any basic properties. It is much more stable to acids than either pyrrole or furan. Thiophene does not undergo the Diels-Alder reaction.

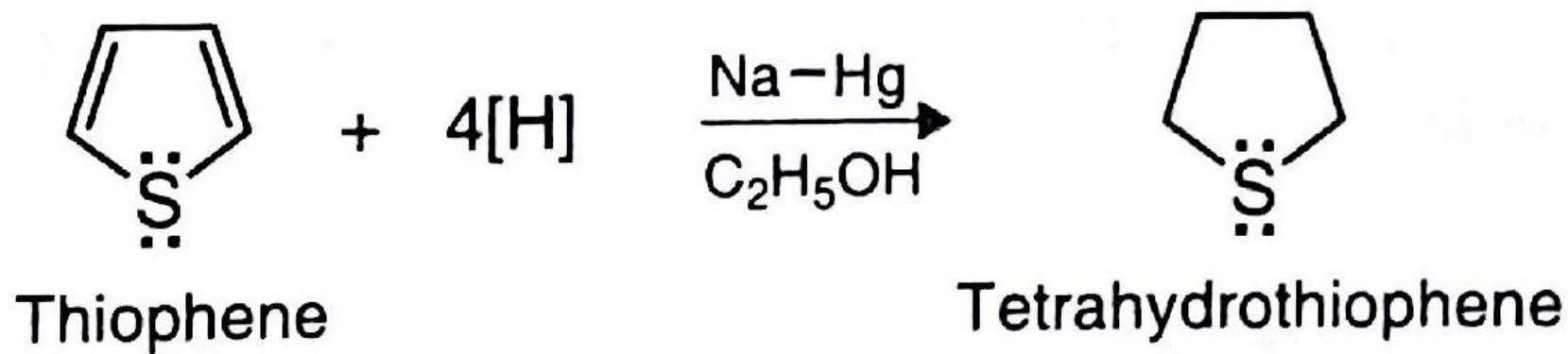
**(1) Electrophilic Substitutions:** Thiophene, like furan and pyrrole, undergoes electrophilic substitution reactions primarily at C-2. Substitution at C-3 occurs only when both of the 2-positions ( $\alpha$  and  $\alpha'$ ) are already occupied.

# Electrophilic Substitution





**(2) Reduction:** Thiophene may be hydrogenated by means of sodium amalgam and ethanol to **tetrahydrothiophene**.



**(3) Desulphurisation:** Catalytic reduction of Thiophene with Raney Nickel results in the removal of Sulphur to form *n*-butane

