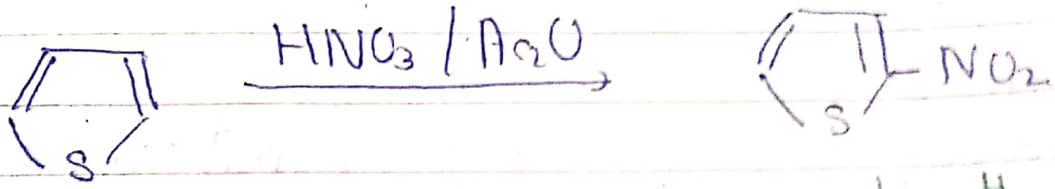
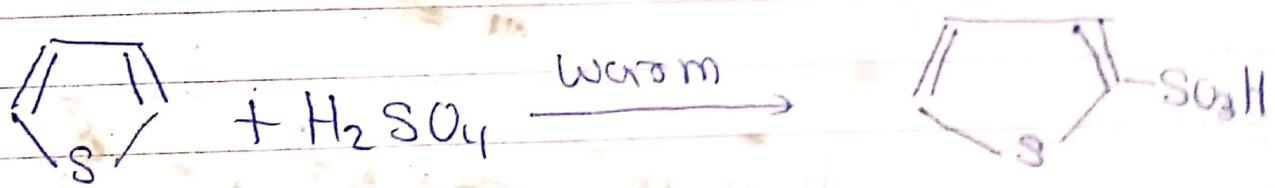
It undergoes most of the electrophilic substitution reaction shown by benzene but under milder conditions.

(a) Nitration- Thiophene can be nitrated by HNO_3 in presence of acetic anhydride giving 2 nitro thiophene.



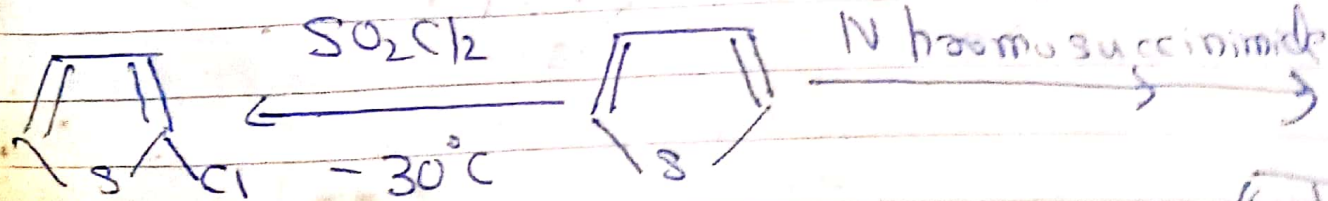
2 nitro thiophene

(b). Sulphonation: Thiophene undergoes sulphonation with conc H_2SO_4 to give thiophene 2 sulphonic acid.

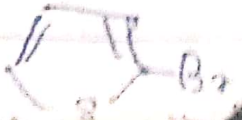


Thiophene 2 sulphonic acid.

(c). Halogenation- Thiophene reacts vigorously with Cl_2 and Br_2 at room temperature but does not react at all with I_2.

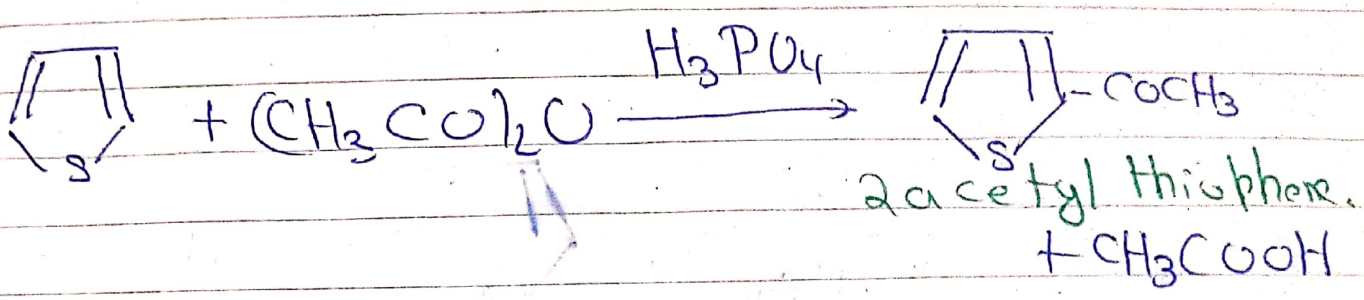


2 chloro thiophene.

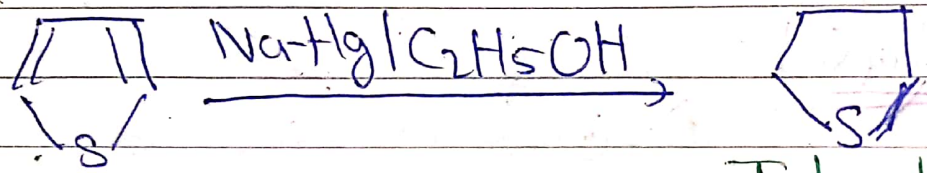


(d). Friedel Craft reaction-

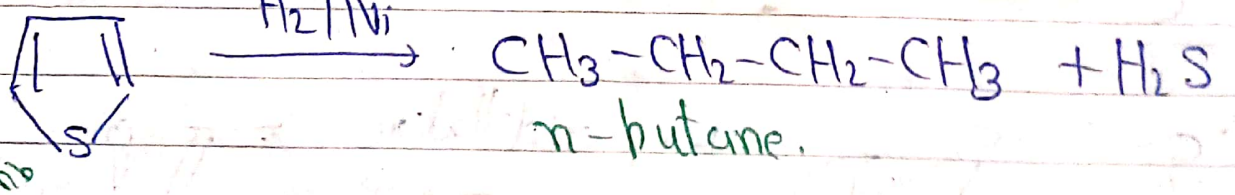
Thiophene may be acylated with acetic anhydride in the presence of phosphoric acid to give 2 acetylthiophene.



(2) Reduction- Thiophene may be hydrogenated by means of sodium amalgum and ethanol to tetrahydro thiophene.



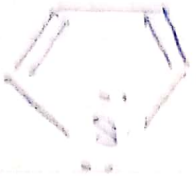
(b). Catalytic hydrogenation using nicked as catalyst results in the formation of n butane.



(3). Reaction with n butyl lithium-

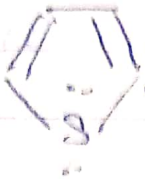
Thiophene reacts with n butyl lithium to form 2 thiophene lithium which reacts with carbondioxide followed by acidification gives thiophene 2nd carboxylic acid.

+ $CH_3CH_2CH_2CH_2Li$



+ $CH_3CH_2CH_2CH_3$

n butane.



$\xrightarrow[\text{(ii) HCl}]{\text{(i) } CO_2}$

Thiophene 2 carboxylic acid.