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Chemistry

SUB. CODE- BSCC2402

For B.Sc. 4th Semester

(Polynuclear Hydrocarbons)

Module-V

Reactions of naphthalene

By

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ODISHA*

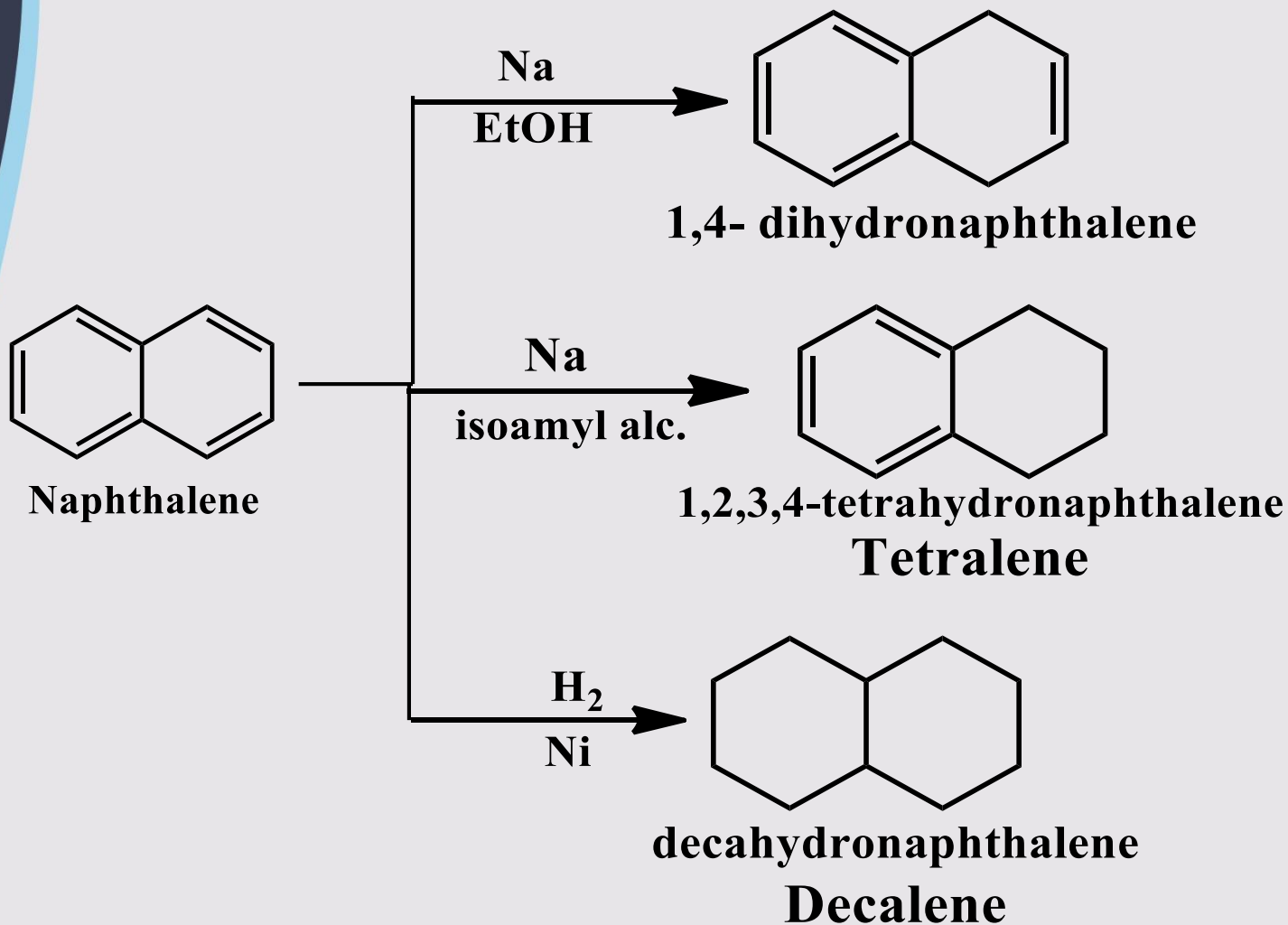


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Reactions of naphthalene

Reduction

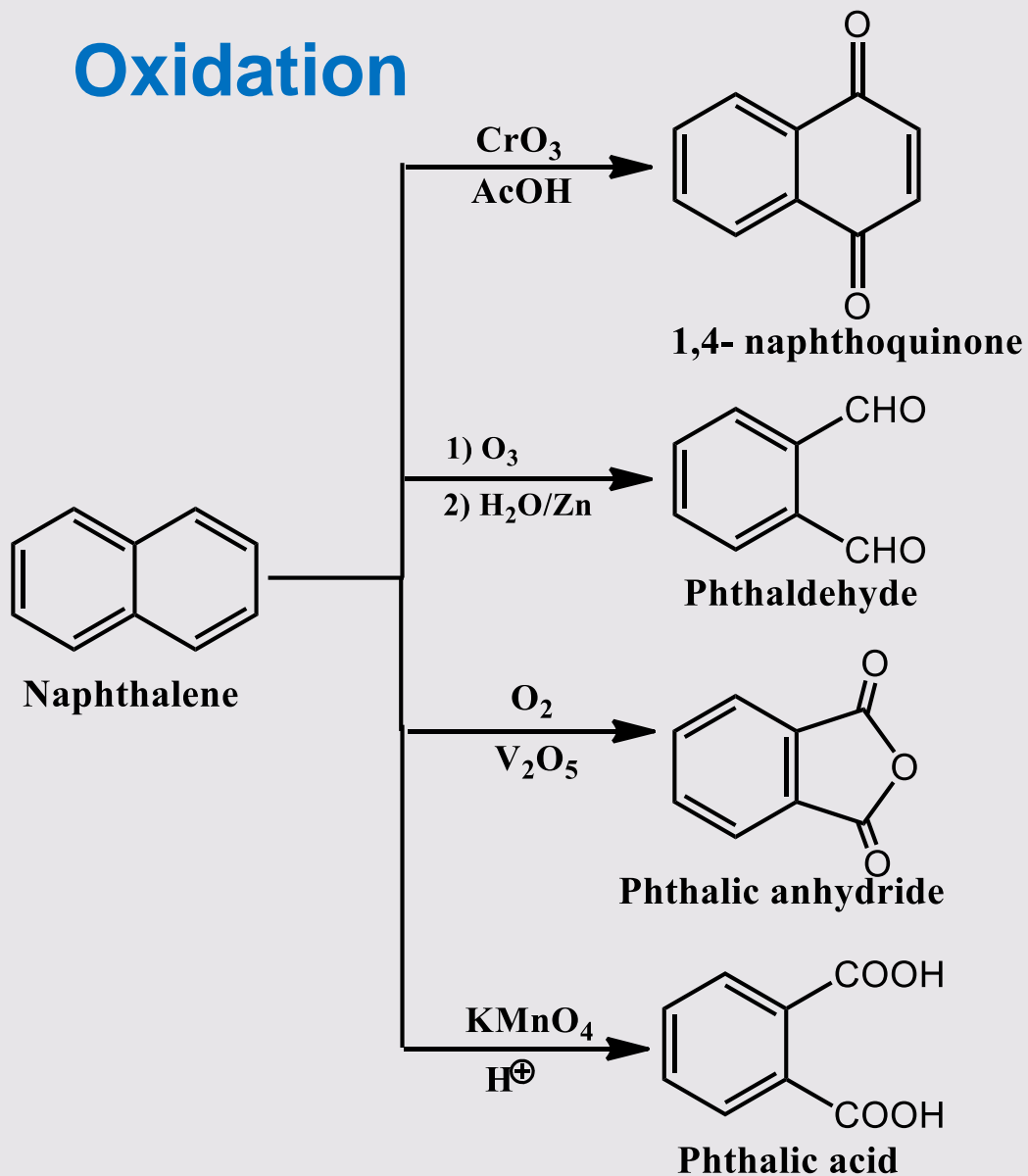




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Oxidation

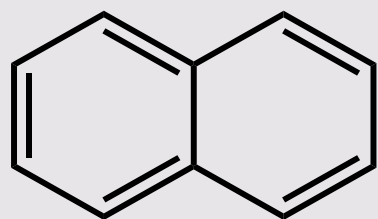




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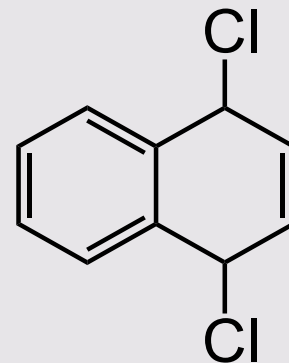
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Addition of Cl_2



Naphthalene

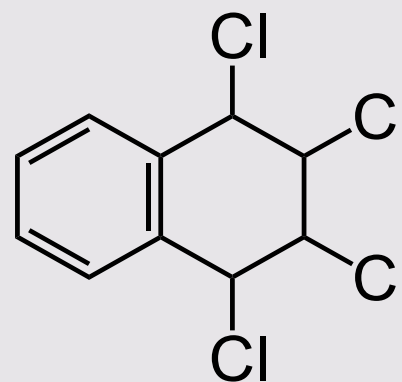
Cl_2



1,4- dichloro- 1,4- dihydronaphthalene

excess

Cl_2



**1,2,3,4- tetrachloro- 1,2,3,4-
tetrahydronaphthalene**



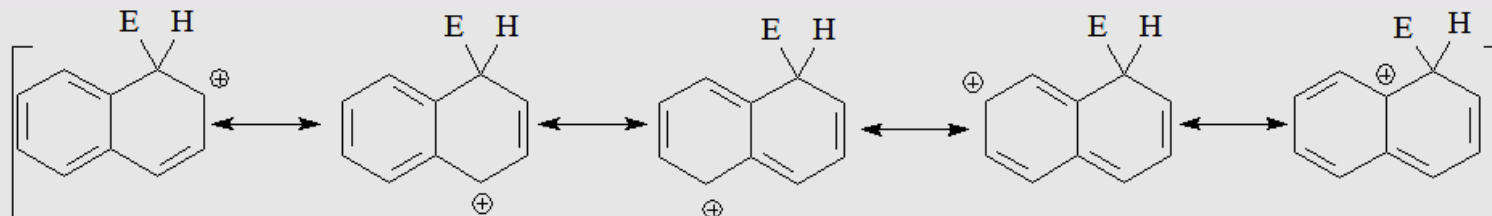
Electrophilic substitution reaction

Naphthalene undergoes ES mostly at alpha-position

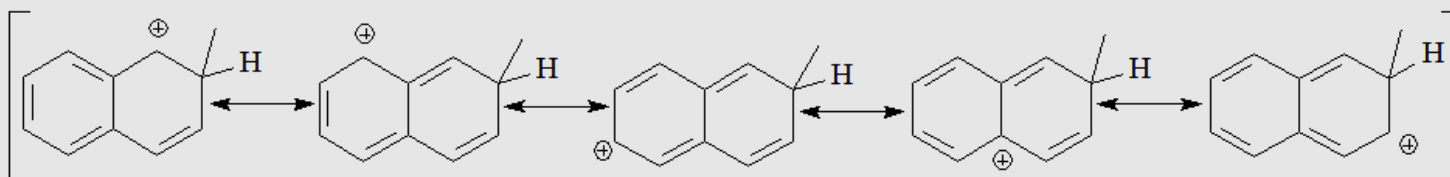
Resonance forms determine higher reactivity at C-1

- ❖ C-1 attack has 2 resonance structures with benzene rings
- ❖ C-2 attack has only 1 resonance structure with a benzene ring
- ❖ The most stable intermediate (C-1 attack) gives faster reaction

Attack at C-1



Attack at C-2

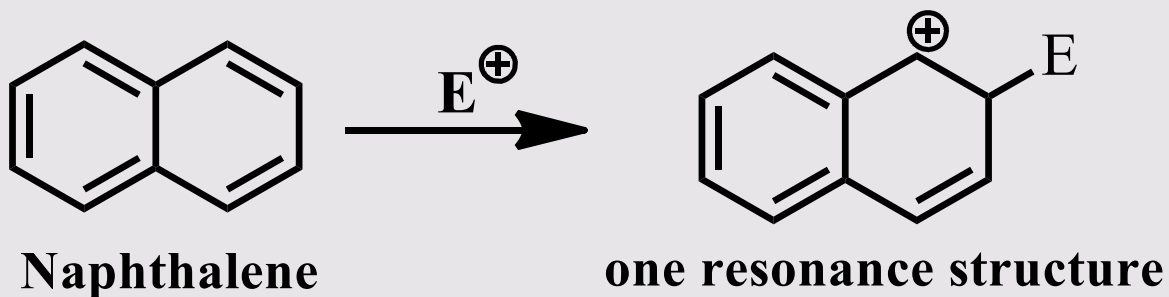
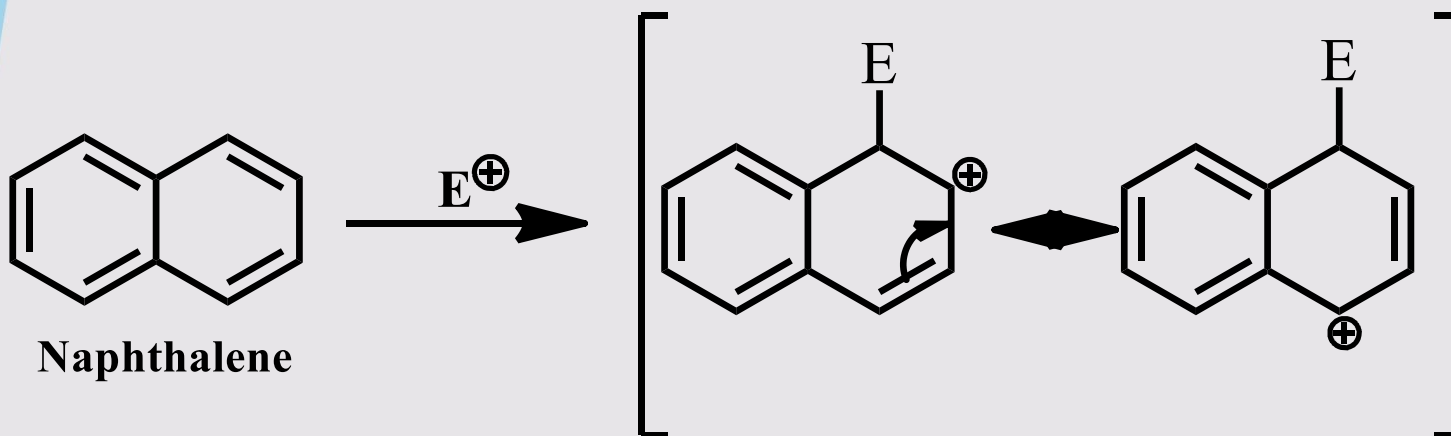




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At position 1; carbocation intermediate stabilize by two resonance structures

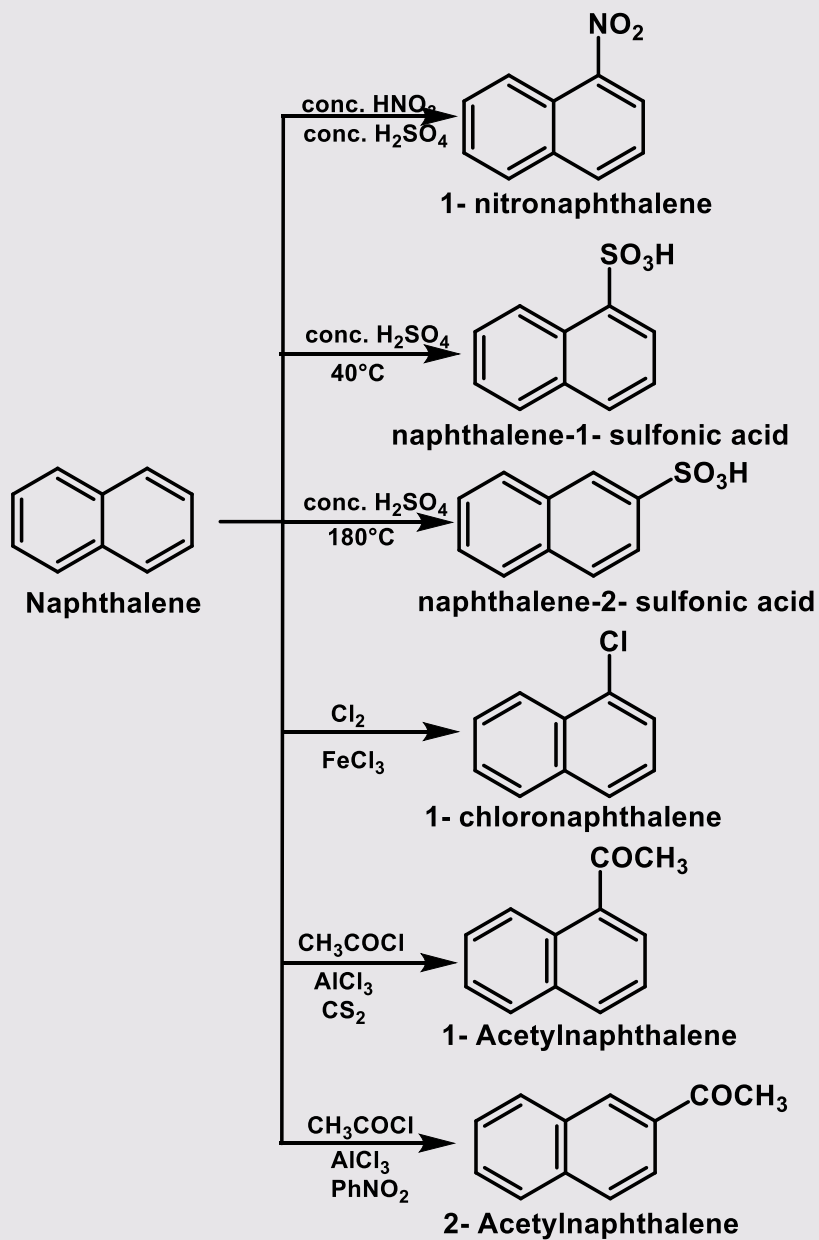


So carbocation is more stable at position 1 than 2



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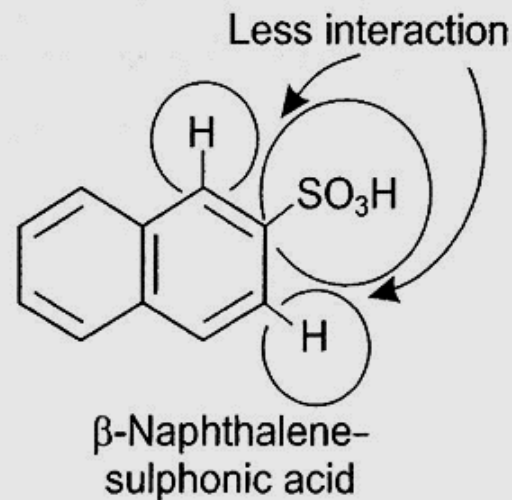
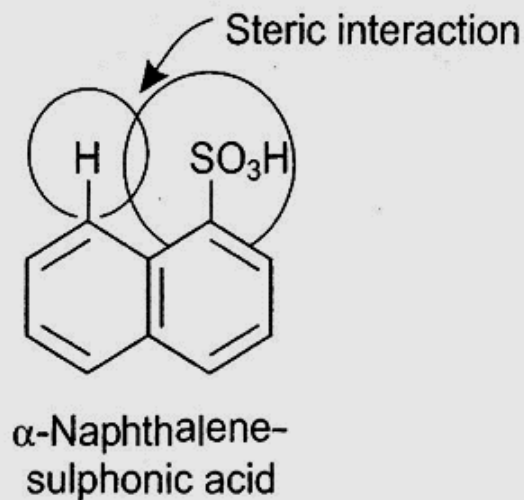


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Sulfonation

- ❖ The lower stability of 1-S is attributed to the steric interaction between the sulfonic group and the hydrogen atom in the 8-position.



Substituted naphthalene

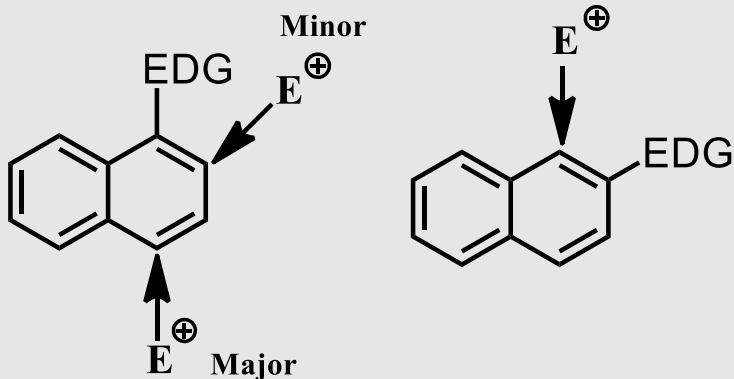


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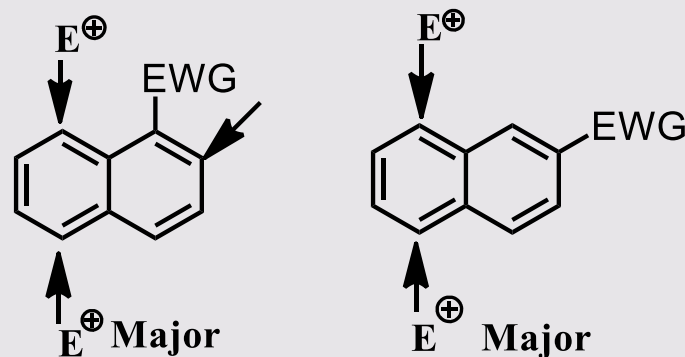
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- ❖ Activating groups direct the electrophile to the same ring; i.e. Electron donating group (EDG): NH_2 , OH , OR , alkyl
- ❖ Deactivating groups direct it to the other ring; i.e. Electron withdrawing group (EWG): NO_2 , CO , COOH , CN , SO_3H

Homonuclear attack



Heteronuclear attack



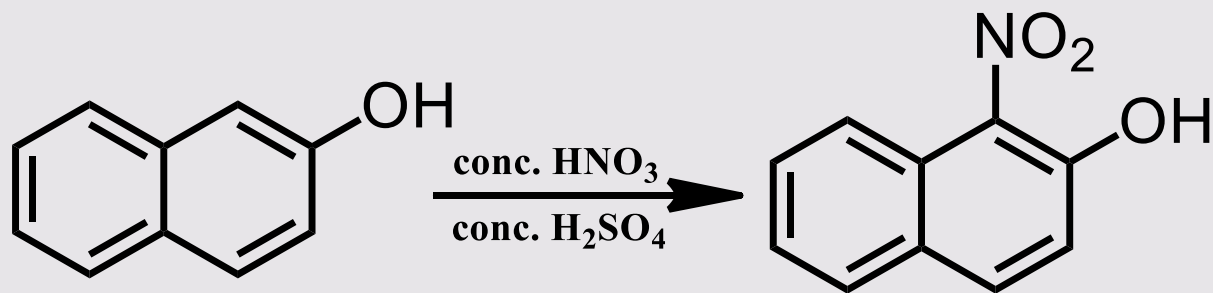
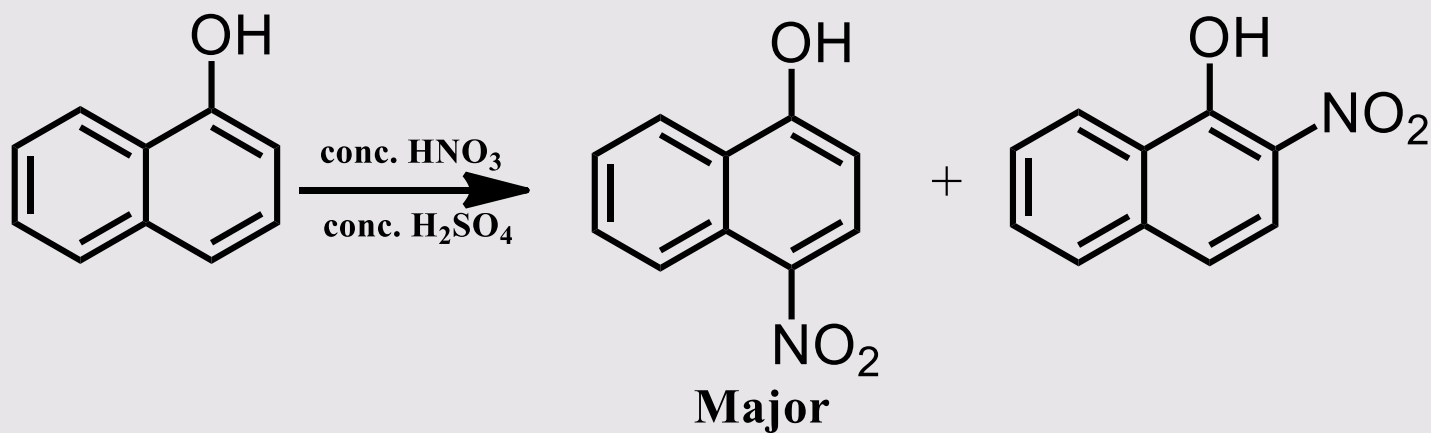


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Examples



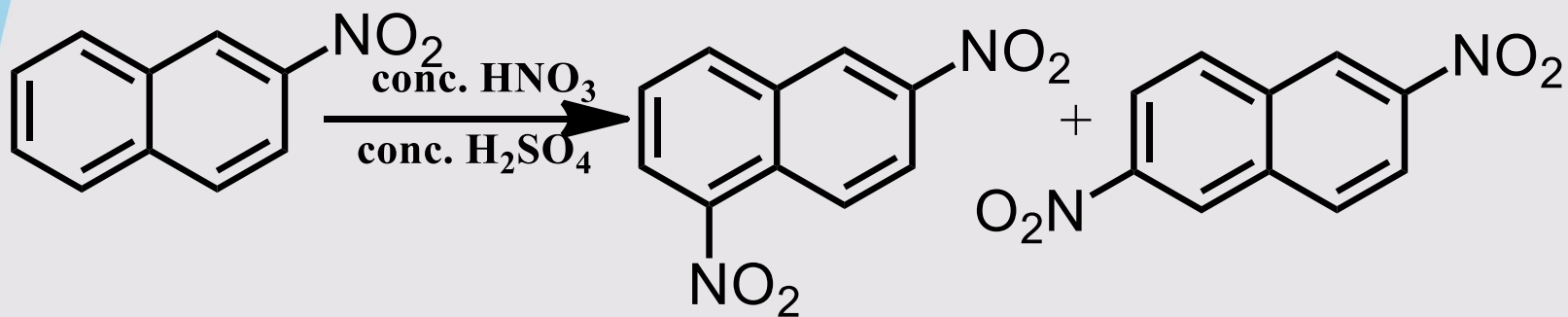
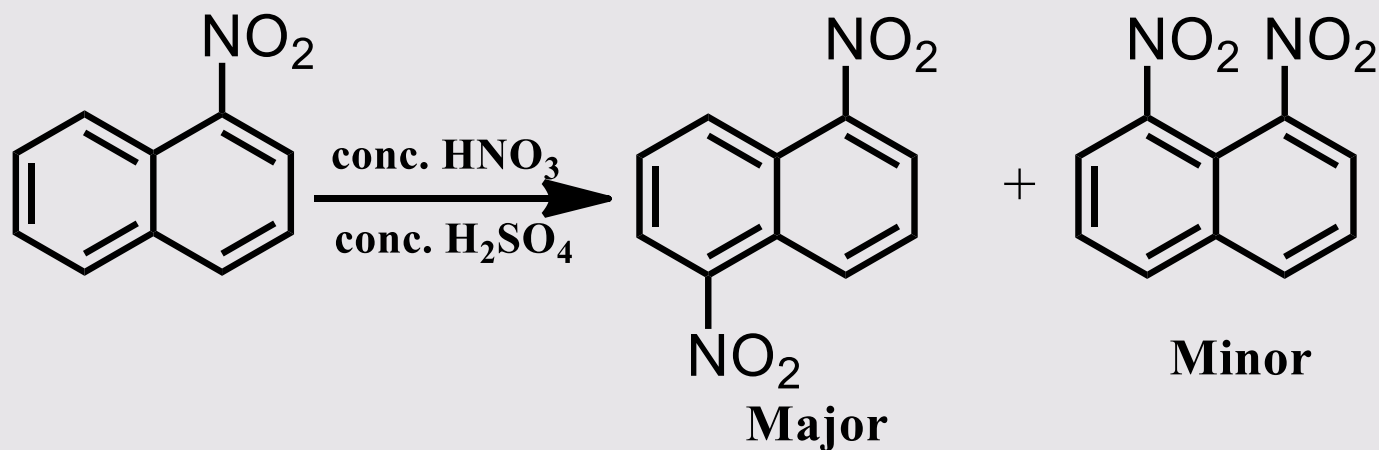


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Examples

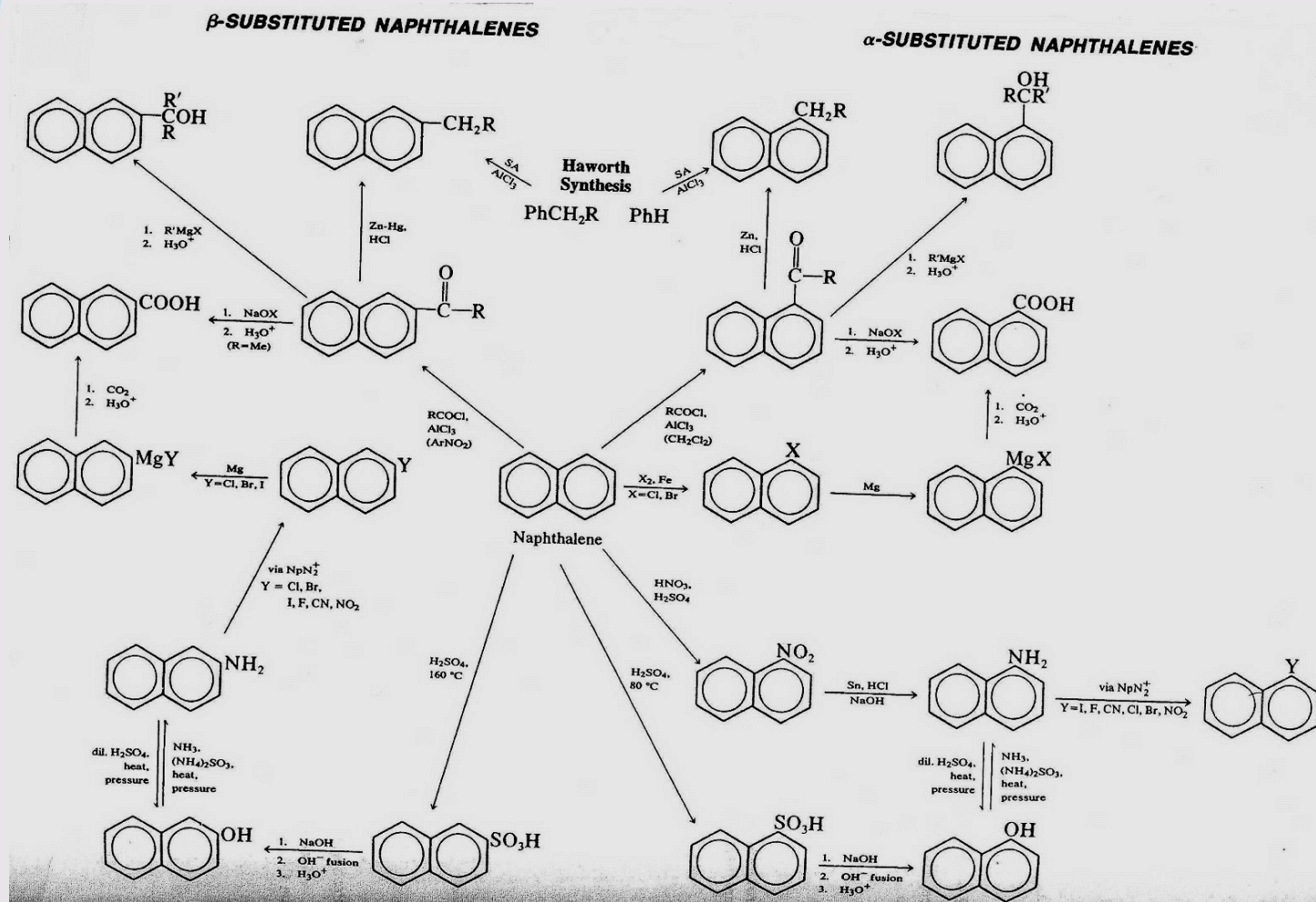




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Summary of naphthalene reactions





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References

1. K.D Sharma and Y. R. Sharma, Kalyani Publishers, Unit-II page-233;
2. University Chemistry, Vol-IV, Dr. U. N. Dash, Dr. KK. Ojha, Himalaya Publishing house, Unit III, page-279