CONJUGATED DIENES

[DEPTH OF BIOLOGY]

- These are open chain alkene which contains two double bond on C-chain
- IUPAC name- Alkadiene

CLASSIFICATION

[DEPTH OF BIOLOGY]

Conjugated diene:

Double bond separated by 1 single bond

Eg; -CH=CH-CH=CH-

Non-conjugated or isolated diene:

Double bond separated by more than 1single bond

Eg; -CH=CH-CH_2-CH=CH-

Cumulated or allenes: [DEPTH OF BIOLOGY]

Double bond on adjacent carbon atom

Eg; -CH=C=CH-

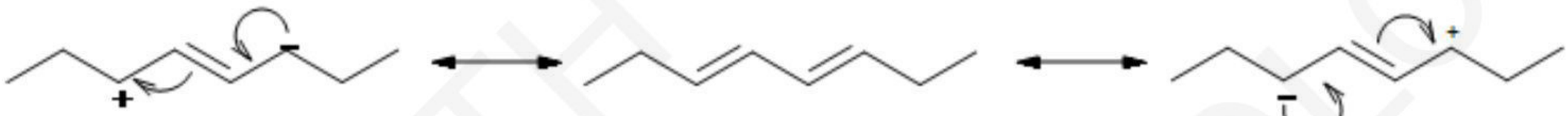
STABILITY OF DIENE

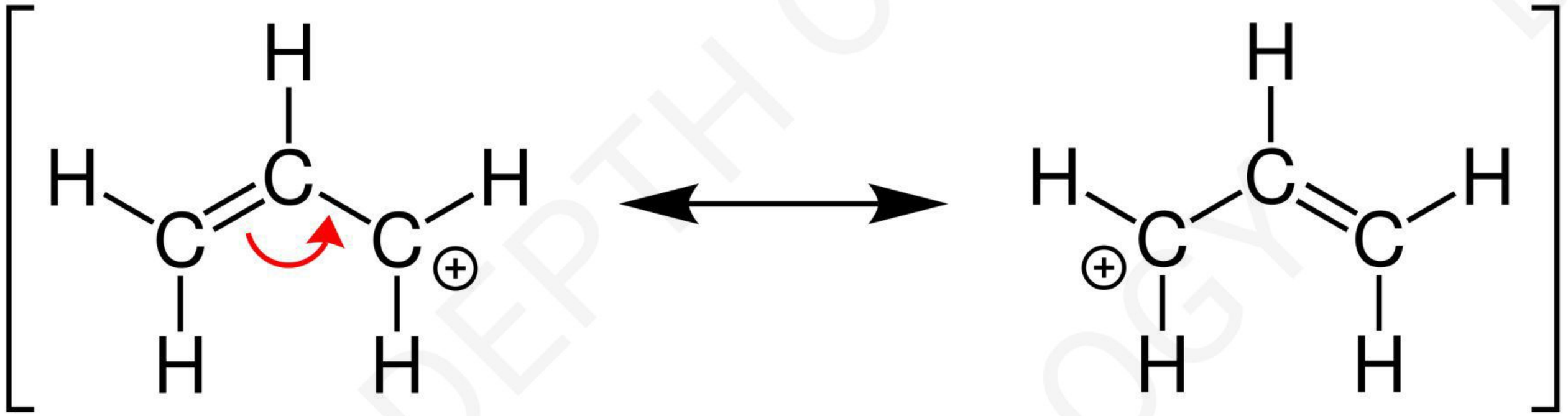
[DEPTH OF BIOLOGY]

Conjugated diene aren more stable than non conjugated diene

RESONANCE- the resonance structure shown by them give a good understanding of how the charge is delocalised across the 4 carbon in the conjugated state.

This delocalisation of charge stabilise the conjugated diene





HYBRIDISATION:

Along with the resonance, hybridisation energy affect the stability of the compound [DEPTH OF BIOLOGY]

Eg; 1,3 butadiene

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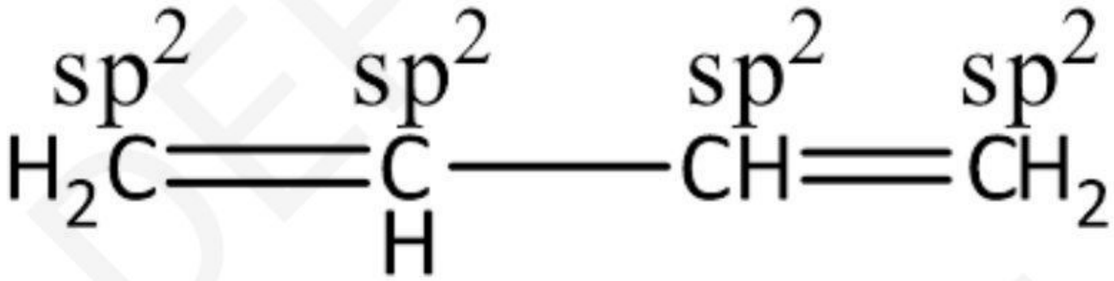
The carbon with single bond are sp2 hybridised unlike in conjugated dienes where the carbon with single bond are sp3 hybridised. This difference in hybridisation shows that the conjugated have more 'e' character and draw in more S-character of ∏electrons thus making the single bond stronger and shorter that an ordinary alkane C-C bond



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LOWERS THE ENERGY

INCREASE THE STABILITY

HEAT OF HYDROGENATION:

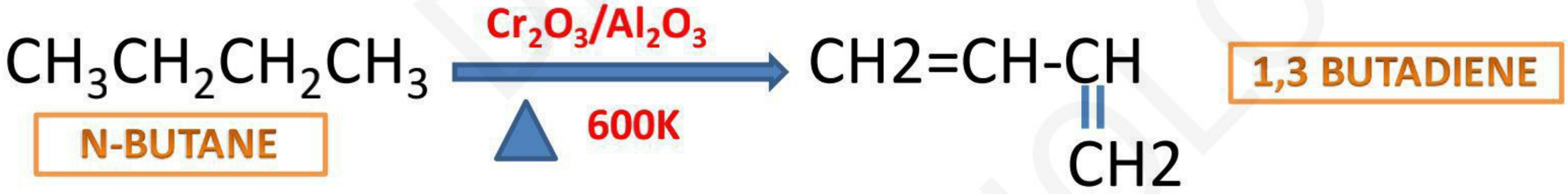
Another useful resource to consider are the heat of hydrogenation of different arrangement of double bond since the higher of the heat of hydrogenation the less stable the compound

Eg ; conjugated diene < isolated diene < comulated diene

[54 Kcal] [60 Kcal] [70Kcal]

Method of prepration

1.Catalytic dehydrogenation



2. Acid catalysed dehydration of alcohol:

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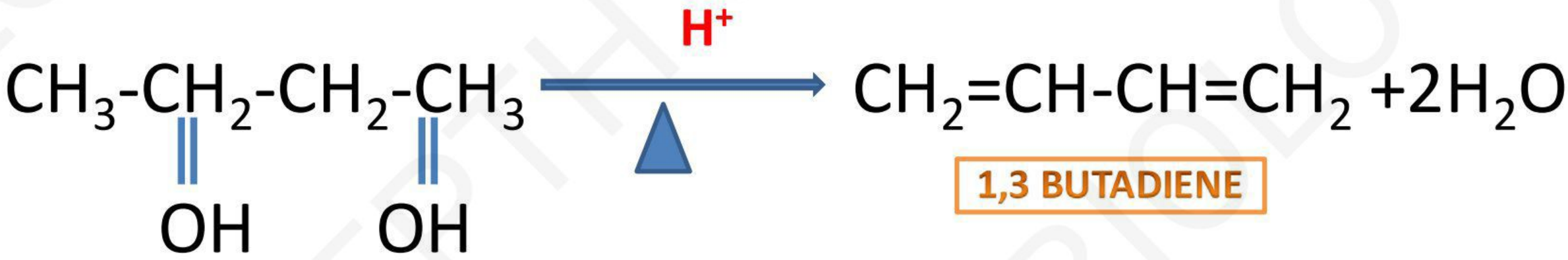
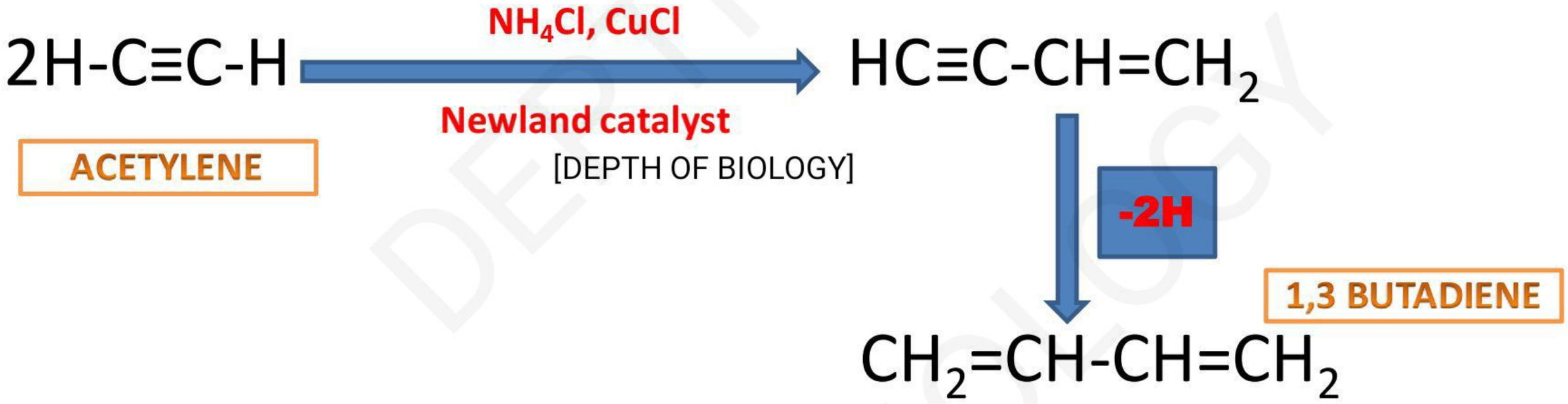


3. DIMERISATION:



[DEPTH OF BIOLOGY]

- **PHYSICAL PROPERTIES :** [DEPTH OF BIOLOGY]

1. 1,3 butadiene is a colourless gas

2. B.p- 4.4 ^{0}c