

ACTIVITY NO. –5

CONVERSION OF UNSATURATED COMPOUNDS TO SATURATED COMPOUNDS

Subject	Science
Class	X
Chapter/Unit	Carbon and its Compounds
Topic	Hydrogenation of Ethyne to Ethane
Time	45 minutes
Nature of Activity	Individual

What will I learn (Learning Outcome)?

To differentiate between saturated and unsaturated compounds and understand conversion of Ethyne to Ethane through Hydrogenation reaction.

Skills:

Analyzing and Creating

What I have to do?

To depict the Hydrogenation reaction by constructing a ball and stick structural model of Ethyne and converting it into Ethane

What do I require?

White rectangular cut out of size 15X10 cm (approximately), red bindis/small red colour circles (to depict carbon atoms), blue bindis/blue colour circles (to depict hydrogen atoms) and match sticks (with coated end removed) or toothpicks (with sharp end removed) and a pen.

What do I need to know?

Carbon is a tetravalent atom. Each carbon atom has the capacity to form bonds with 4 other monovalent atoms. Therefore, Carbon has the unique ability to form bonds with

other atoms of carbon to form long chain, branched chain and ring compounds. This property of carbon is termed as catenation. Carbon atoms may link with each other by a single bond, double bond or a triple bond. Compounds with a double or a triple bonds between two carbon atoms are called as **unsaturated carbon compounds** and the compounds with a single bond between two carbon atoms are called as **saturated carbon compounds**.

➤ **Teacher's Activity**

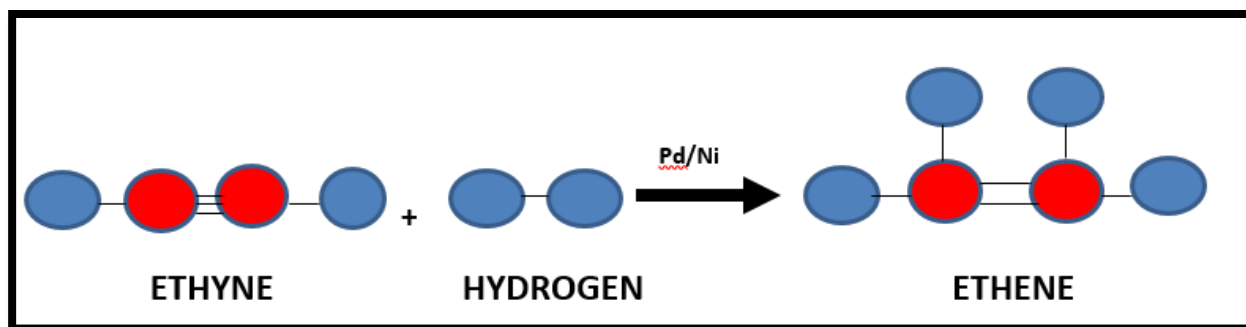
Teacher will:

1. recapitulate the previous knowledge of the students.
2. brief the use of red bindis as Carbon atoms, blue bindis as Hydrogen atoms and match sticks for making the bonds.
3. make necessary arrangements for the material required for the activity and give step wise instructions for the activity

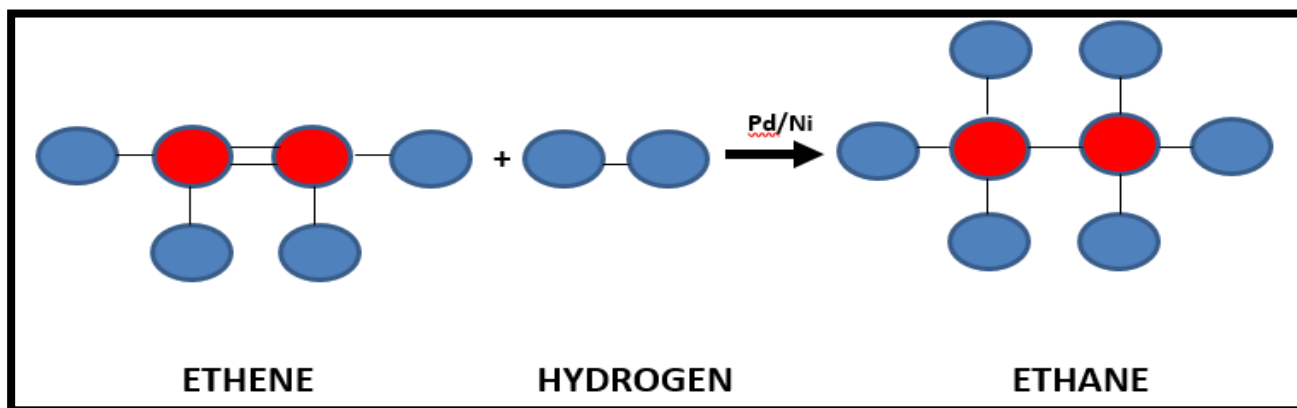
How will I proceed?

➤ **Student's Activity**

1. Take a rectangular cut out and paste two red bindis adjacent to each other at an approximate distance of 2-3cm.
2. Place three match sticks between the two red bindis to depict a triple bond.
3. Paste one blue bindi on the either side of each red bindi to depict a hydrogen atom. Complete the bond formation between the red and blue bindi by a placing one match stick between them.
4. Similarly, construct molecular model of Hydrogen, using two blue bindis and two matchsticks between them, adjacent to the Ethyne molecule formed in the above step.
5. Put a plus sign between them using a pen. Make a forward arrow using a toothpick.



6. Complete the above reaction depicting Hydrogenation of Ethyne to Ethene by making a similar structure for Ethene molecule using red and blue bindis.
7. Now, construct another molecule of Hydrogen adjacent to Ethene like in step-4.
8. Complete the above reaction depicting Hydrogenation of Ethene to Ethane by making a similar structure for Ethane molecule using red and blue bindis.



What have I observed?

S. No.	Name of the compound	Number of bonds between Carbon-Carbon	Number of bonds between Carbon-Hydrogen
1.	Ethyne		
2.	Ethene		
3.	Ethane		

What have I learnt?

_____ bond between Carbon-Carbon of Ethyne breaks down to generate _____ free bonds for addition of a monovalent atom. Therefore, single molecule of Ethyne can add _____ molecules of a Hydrogen to give Ethane

What am I curious to learn?

- Let us make similar structures for Propene, Propyne, Butene and Butyne. Try adding Hydrogen, Chlorine or Bromine to each of the above chemical compounds. Name the chemical compound produced by after adding each above gases.

Let me evaluate myself

Q1. Define Addition Reaction.

Q2. Rewrite the above reactions in form of chemical equations.

Q3. Which catalyst is used for Hydrogenation reactions? What is the role of a catalyst in the above reactions?

Q4. Write any one industrial application of Addition reaction

Q5. How can we differentiate between butter and cooking oil using Bromine water?
