

## **MODULE -5**

### **Catalytic Reforming**

**Q1:** What are Lewis and Bronsted acid sites.

**A1:** An acid site on a catalyst where the acidic entity is a positive ion (cation) such as  $\text{Al}^{3+}$  rather than ionisable hydrogen. On the other hand Bronsted acid site has acidic entity in the form of ionisable hydrogen like mineral acid sulfuric acid.

**Q2:** What is gas oil.?

**A2:** General term for a product boiling above  $180^{\circ}\text{C}$ . Diesel, turbine and jet fuels are blended from gas oil.

**Q3:** What is typical feed range used for reforming?

**A3:** Typically, the feed to a cat reformer unit for gasoline production is heavy straight-run naphtha with an initial boiling point (IBP) of  $194^{\circ}\text{F}$  and final boiling point (FBP) of  $284^{\circ}\text{F}$ . Benzene is an undesirable component in the gasoline because of environmental pollution concerns. It is therefore important to minimize or exclude any benzene precursors in the cat reformer feed by keeping the feed IBP higher than  $180^{\circ}\text{F}$ . The cat reformer feed is hydrotreated in a naphtha hydrotreater unit to remove any sulfur, nitrogen, and other impurities which can poison the reforming

**Q4:** What is steam reforming and why it is important in petroleum refining process?

**A4:** Hydrocarbon steam reforming is an important process for hydrogen production. Hydrogen is a valuable raw material for chemical and petrochemical industry and it is also used as a clean combustible. Steam reforming process transforms a liquid hydrocarbon stream into a gaseous mixture constituted by  $\text{CO}_2$ ,  $\text{CO}$ ,  $\text{CH}_4$ , and  $\text{H}_2$ .

**Q5:** What is catalytic reforming?

**A5:** Catalytic reforming is a chemical process used to convert petroleum refinery naphthas, typically having low octane ratings, into high-octane liquid products called reformates which are components of high-octane gasoline (also known as petrol)

**Q6:** What are the catalyst used in reforming?

**A6:** Most catalytic reforming catalysts contain platinum or rhenium on a silica or silica-alumina support base, and some contain both platinum and rhenium.

**Q7:** What is the purpose of reforming process?

**A7:** The purpose of Reforming process is to produce high octane number reformat reformat, which is a main component for motor fuel, aviation gasoline blending or aromatic rich feedstock. Hydrogen rich gas hydrogen gas Due to the nature of the reactions, reforming process produces LPG.

**Q8:** What are the desirable reaction during reforming?

**A8:**Naphthenes dehydrogenation  
Paraffin's Dehydrocyclization  
Linear Paraffin Isomerization  
Naphthenes Isomerization

**Q9:** What is the effect of pressure on reforming?

**A9:** Low pressure encourage dehydrogenation reaction ,while no noticeable effect of pressure on isomerization may be expected. Coke formation is more at low pressure. Increase in pressure causes dealkylation very much. Hydrocracking and elimination reaction are directly related to partial pressure of hydrogen.

**Q10:**What is effect of temperature on reforming?

**A10:**Except hydrogenation reaction which exothermic all other reaction are favoured by increasing temperature. With increase of temperature, chance of degradation of product, and coke deposition are likely.

**Q11:**What is Rhein Forming?

**A11:** This is a fixed bed regenerative reforming process. Rhenium-platinum combination are used as catalyst which are quite good in resisting fouling. This can be operated at press below 20 atm.

**Q12:** What is Power forming?

**A12:** Power forming process is designed to operate in cyclic or semi regenerative unit. Reformate of octane value 85to102+ are common product of this process