

▲ Who should attend?

**Engineers and managerial staff** from refining and petrochemical companies involved in operation, process, unit start-up, technical assistance, licensing, process or project for engineering companies.

▲ Duration

5 days

▲ Dates & Location

April 7-11, 2008  
Rueil Malmaison

▲ Tuition Fees

€ excl. tax 2,000

▲ Lecturers from

- ENSPM FI - IFP Training
- Institut Français du Pétrole
- Axens

Ref. **PTF / CATAL-E**

# CATALYSTS IN THE REFINING AND HEAVY PETROCHEMICAL INDUSTRIES

## OBJECTIVES

To provide the participants with a **broader understanding of catalysts**, their preparation, the problems involved in their utilization, **unit start-up, industrial performance control**, investigation of the **principal incidents** likely to occur during operation, unit **shutdown** and regeneration.

On completion of the course, participants have gained an understanding of:

- the function and the basic mechanism of a catalyst
- problems related to industrial use (start-up, shut-down, regeneration, ...)
- performance monitoring methods
- the influence of operating parameters on catalytic selectivity and stability.

## COURSE CONTENT

### CHARACTERISTICS AND PROPERTIES OF INDUSTRIAL CATALYSTS

1.5 days

Catalyst markets in the refining and heavy petrochemical industries.

**Main types of catalytic processes.**

Thermodynamics and kinetics of chemical reaction.

Catalytic action in heterogenous catalysis.

Quality requirements for an **industrial catalyst**.

Measurement of catalyst properties.

Notions of catalyst development and industrial production.

### IMPLEMENTATION, OPERATION AND PERFORMANCE CONTROL OF INDUSTRIAL CATALYSTS

3.5 days

*The following items for each process are presented :*

- process and chemical reaction characteristics*
- selection of catalytic formulas and their developments*
- catalyst implementation*
- process scheme.*

*Each one emphasizes on the special features for each type of catalyst.*

#### Catalytic reforming catalysts and benzene treatment

0.5 day

- Precautions for start-up, monitoring and maintaining catalyst activity.
- Ageing, regeneration, incidents.
- Developments in catalytic formulas and in the process scheme.
- Solutions for the benzene removal.

#### Isomerization catalysts

0.25 day

- Different types of catalysts, influence on the process and on the isomerate octane number.
- Influence of the poisons on the catalytic activity and operation problems linked to the type of the catalyst.

#### Catalytic cracking catalysts

0.5 day

- Role of the zeolite structure.
- Analysis of catalyst ageing by coking, by textural and structural modifications and by poisoning by impurities in the feedstock.
- Improvements in catalyst regeneration and gasoline octane number, nickel passivation.
- Adaptation of catalyst and process schemes for residue treatment.

#### Alkylation catalysts

0.25 day

- Mechanisms of the liquid homogeneous HF and H<sub>2</sub>SO<sub>4</sub> catalysis.
- Process performances and particular constraints.

#### Hydrotreatment and hydrocracking catalysts

1.5 days

- Sulfiding, start-up, performance control, regeneration, environmental problems.
- Specific problems in treating unsaturated cuts (coking, visbreaking, FCC).
- Adaptation of catalytic formulas for heavy feedstock hydrocracking.
- Desulfurization of FCC gasolines minimizing octane loss.

#### Selective hydrogenation catalysts downstream of olefin production processes

0.5 day

- Specific constraints in treating C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub> cuts and cracked gasoline.
- Technological means of controlling exothermicity.
- Maintaining activity and selectivity of catalysts.
- Inhibitors and poisons.
- Precautions for start-up.
- Reactivation, regeneration.

*An optional visit of pilot units and laboratories may be organized. Depending on the availability of the facilities and participants registrations.*