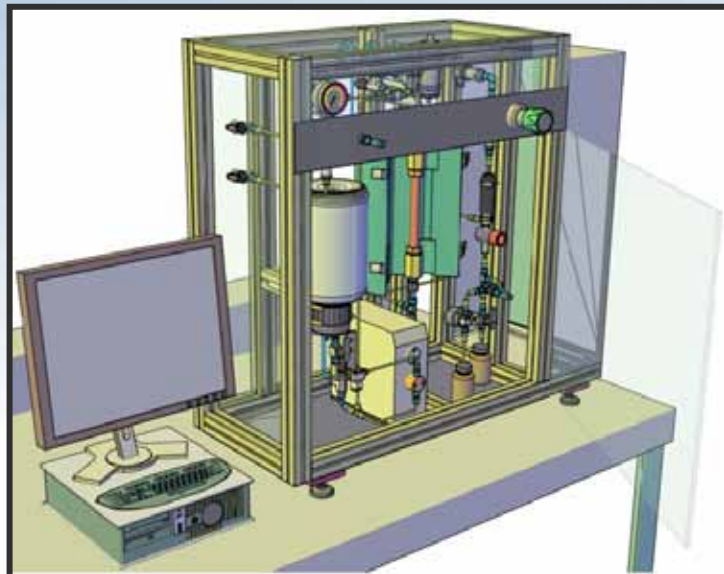


From Advanced Research Instruments



Vinci pilot plants at IFP R&D center in Lyon (Photo: Patrick Chevrolat)

To Educational Tool



Vinci-Technologies has a specific knowledge gained by providing worldwide R&D centers, process licensors, catalyst manufacturers, refining and petrochemical quality control labs with the most advanced pilot plants. This know how is now available to students with Vinci-Technologies Educational Pilot Plant (EPP)

▶ EPP – An ideal tool for teaching & educational purposes

The pilot plant is the ideal tool to teach students in Chemical Engineering and Refining processes how to handle and exploit a catalyst on a typical refinery reaction :

1. How to perform proper catalyst activation

Student will learn the proper way to activate a catalyst without damaging it

2. How to play with reaction variables for attaining the best catalyst performance

Student will learn how a temperature change may affect catalyst activity and selectivity. Space velocity will be correlated to temperature changes. Effect of pressure will also be determined.

3. How to play with reaction variables for attaining the best catalyst stability and life

Catalyst performance decrease with time is a major concern for fuel producers. Students will learn how temperature and pressure impact catalyst life and how hydrogen may be used as a 'catalyst cleaner' in a refinery.

4. How to analyze effluents to determine approaches to equilibrium

Students will learn how to optimize GC settings to match the best separation between product components

The main goal of Vinci-Technologies is to support the research and the development of processes through the engineering, design and construction of research test units in order to help our client, mostly world wide company R&D centers, to bring their technologies to technical success.

Today, in order to meet the needs of industry, Vinci proposes to support universities in training professionals by offering a turn key educational pilot plant.

Vinci-Technologies Educational Pilot Plant has been designed in order to help universities in developing practical training sessions for students. In complement of their own academic program, Vinci-Technologies proposes to accompany universities and schools teaching team by performing a general introduction to isomerization processes in refineries since the late 60s' which will exemplify the reaction performed in the EPP. Vinci-Technologies proposes a turn key program based on paraffin isomerization reaction including the general introduction, pilot plant, catalyst, plus Vinci training if necessary.

▶ EPP – Process and Technical application

Paraffin isomerization is a catalytic reaction performed in most refineries throughout the world. The principle reaction is to convert C5 (pentane) and C6 (hexane) paraffins, which are mainly linear in crude oil, to branched paraffins which have a better MON (Motor Octane Number) and RON (Research Octane Number). The reaction is equilibrated. Higher branched paraffin contents and thus higher octane values are thermodynamically favored for lower reaction temperatures. However, catalytic activity is also lower when reaction temperature decreases. Hence a trade off is to be found between favorable thermodynamics and catalytic activity for any kind of catalyst, which is the fundamental job to be performed on every kind of catalyst performance test.

▶ EPP – Technical description and Main features

The pilot plant is delivered ready for use. Reactor is filled with a well known, reliable and robust catalyst, consisting of dispersed platinum over a silice alumina based support. Feed is normal hexane and reaction is performed in the gas phase under moderate (<50b) pressure. The catalyst is a bi-functional one, with the metal (platinum) able to dehydrogenate paraffins, and an acidic support able to isomerize olefins. Platinum is able to hydrogenate branched olefins to the corresponding, high octane paraffins. Bifunctional catalysts have been used extensively, even though they are now supplanted by more active chlorinated alumina catalysts, they are good candidates for a versatile, teaching oriented catalytic pilot plant.

The equipment is composed of an inlet gas line, a liquid line, a reactor section with corresponding furnace, and a separation module. Liquid product can be recovered in order to be analyzed in a Gas Chromatograph.

▶ EPP – Advantages

- Supply of catalyst for immediate experiment
- Small bench top equipment
- Real time reaction monitoring
- User-friendly interface
- Data logging facility available (recovery on Excel)
- Safe and student friendly
- Easy maintenance
- General introduction to isomerization processes (option)