

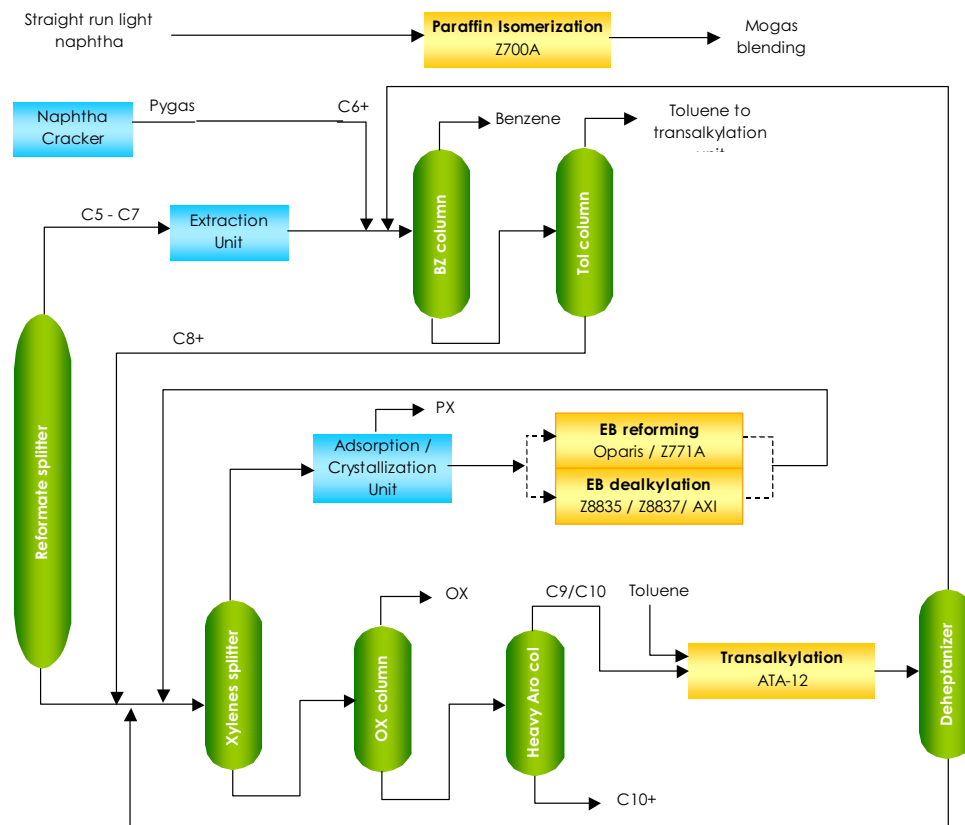
ZEOLYST AROMATICS

Zeolyst International has a specialty catalyst portfolio of products that includes a wide range of catalysts used in the production of Paraxylene and Benzene. Coupled with a wide range of optimization services with its partners, Zeolyst has been extremely successful in assisting numerous plants to maximize returns from existing equipment – reacting successfully to the market fluctuations for Paraxylene, Benzene and Toluene.

Zeolyst's successful track record in helping plants achieve step changes in profitability has established its reputation firmly as an Aromatics technology partner to several companies among the largest paraxylene producers globally.

Our Mission:

Help deliver improved economics to customers through the superior performance of its catalysts with unique advantages of Zeolyst technology & Achieve this via optimum use of the catalyst and plant



Xylene Isomerisation Catalysts

Ethyl benzene (EB) reforming type

- [Oparis™](#)
- Z771A

Ethyl benzene (EB) dealkylation type

- Z8835
- Z8837
- AXI

C7, C9+ Aromatics Transalkylation Catalyst

- [ATA-12](#)
- ATA-11

Paraffins Isomerisation Catalyst

- [Z700](#)

OPARIS™

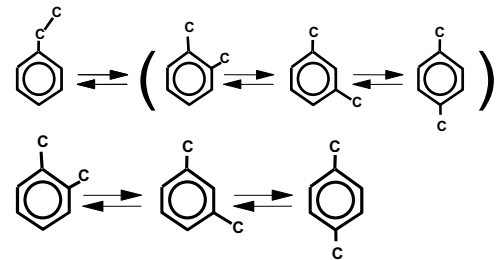
Xylene Isomerization Catalyst - Ethylbenzene reforming type

OPARIS™ is a new generation catalyst with a greatly improved para-xylene yield over other commercial catalysts. OPARIS® is based on a proprietary zeolite and platinum as the active materials. The catalyst combines a high activity for conversion of ethyl benzene into xylenes with very low by-product make and superior activity and stability. OPARIS™ was developed in the laboratories of IFP and is manufactured and marketed by Zeolyst International and provided with grassroots licenses in conjunction with Axens.

Oparis™ is the current market performance leader with unparalleled overall plant efficiency of feed to paraxylene, exceptionally low C9 aromatics losses and improved stability.

Applications

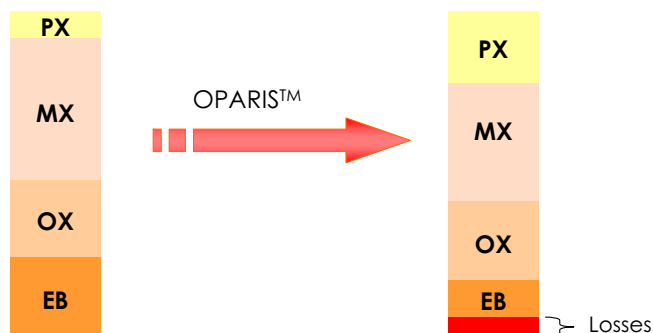
OPARIS™ is used in aromatics complexes when conversion of ethyl benzene to xylenes is required in combination with isomerization of xylenes into the equilibrium composition. Appropriate process conditions can achieve ethyl benzene conversion levels up to 40% whilst the approach-to-equilibrium for para-xylene is almost at the thermodynamic limit of 99%. Due to its very high activity and selectivity, OPARIS™ can be used for catalyst replacement when debottlenecking and/or minimum benzene production is desirable.



Feeds

Typical feeds processed over OPARIS™ are C8 -aromatics streams depleted from paraxylene, and sometimes also from orthoxylene; usually effluent from a crystallizer or from an absorption paraxylene recovery unit.

When OPARIS™ catalyst is applied, high concentrations of ethyl benzene in the fresh feed to the complex can be used because the high conversion limits build-up of ethyl benzene in the recycle. This gives the user the ability to blend in large amounts of C8 aromatics extracted from pygas streams that are high in ethyl benzene.



Oparris™ Advantages

- o High PX approach to equilibrium achievable with low C8 aromatic losses
- o Low C9+ aromatics production
- o High EB approach to equilibrium and high EB conversion

Activity

OPARIS™ activity is higher than that of other commercially available catalysts. Activity decline is extremely low and long cycle lengths are expected, but of course cycle length depends also on feedstock, operating severity and unit constraints.

Regeneration

During operation catalyst activity slowly declines mainly because of coke lay-down. The activity can be restored to a large extent by carbon burn-off. Regeneration can be performed in-situ and ex-situ.

IFP can provide on request feasibility studies, revamps, grass-roots designs and process technical assistance. Also available are the proprietary Axens CATAPAC® catalyst dense loading technology, and the Axens TEXICAP® catalyst cover for radial flow reactors

Commercial Experiences

Oparis has been commercialized since early 2001. To date, we have applied Oparis at a 10 commercial units. It has been proven in numerous applications to be a stable catalyst with good regenerability.

Supply and Technical Support

Contact Us

Zeolyst International will be pleased to provide OPARIS™ performance estimates for catalyst replacement. Zeolyst provides start-up assistance and operational advice. Immediately after start-up the operation conditions will be fine-tuned together with the operational staff. The catalyst performance will be monitored and during normal operation reviews will be held at the site. A telephone help-desk is available.

ATA-12

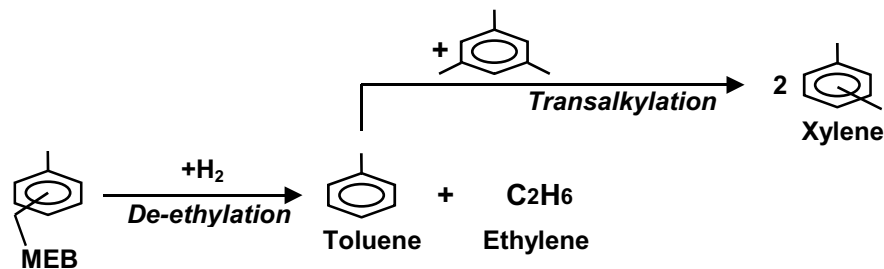
Advanced Transalkylation Catalyst

ATA-12 is a new catalyst that utilizes a zeolite as the active material. Developed in the SK Corp and Zeolyst laboratories, it is especially designed for high total conversion and feed composition flexibility. ATA catalyst was commercialized in 1999 and there are a total of 9 units in operations.

Applying sophisticated catalyst manufacturing technology, ATA-12 combines a high activity for conversion of toluene and C9+ aromatics into benzene and low EB content mixed xylenes with superior catalyst stability and yields

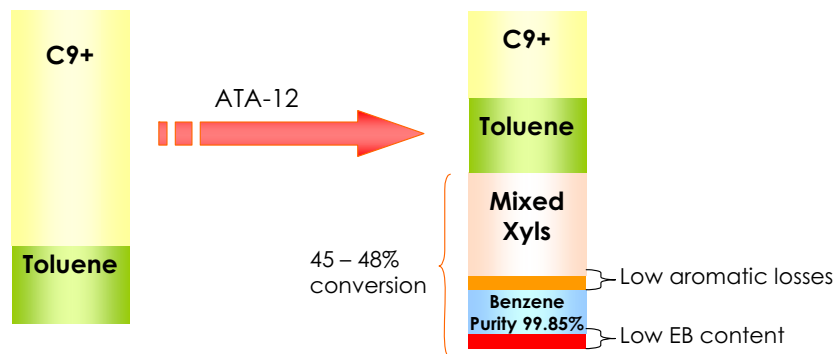
Applications

ATA-12 is used in aromatics complexes in the toluene disproportionation unit or transalkylation unit when conversion of toluene and C9+ aromatics to mixed xylenes and benzene is required. Processing C9+ aromatics in a transalkylation unit shifts the chemical equilibrium in the unit away from benzene production and towards xylene production. The transalkylation process provides an ideal way of producing additional mixed xylenes from low-value toluene and heavy aromatics. The incorporation of a transalkylation unit into an aromatics complex can more than double the yield of para-xylene from naphtha feedstock



Feeds

One of the major benefits of the ATA-12 catalyst is its feed flexibility. The ATA-12 catalyst can process feed compositions ranging from benzene or 100% toluene to 100% C9+ aromatics. This feed flexibility allows the user to optimize feed sources and effectively capture market price swings.



ATA-12 Advantages

- o Process up to 100% C9+ feed
- o High C9+ aromatics conversion
- o High xylene yields with low EB content
- o High benzene purity – extraction unit can be bypassed
- o Low aromatic losses
- o Low H₂ consumption
- o Catalyst stability and long cycle length

Activity

ZEOLYST ATA-12 activity is higher than that of other commercially available transalkylation or toluene disproportionation catalysts. The increased activity allows for a reduction of the required catalyst volume compared to traditional catalysts and the users also benefit in lower utility costs. Activity decline is extremely low and long cycle lengths are expected, but of course cycle length depends also on feedstock, operating severity and unit constraints. The catalytic attributes of the ATA-12 catalyst make it a logical catalyst choice when converting a HDA unit or semi regen reformer into a transalkylation unit.

Regeneration

During operation catalyst activity slowly declines mainly because of coke lay-down. The activity can be restored to a large extent by carbon burn-off. The regeneration can be performed in-situ. A small optimized amount of hydrogenating metal is present to abate coke lay-down and assist coke burn-off.

Commercial Experiences

ATA-11 has been commercialized since 1999 and has evolved to an improved product ATA-12 in 2002. To date, we have applied the ATA catalyst technology at 9 commercial units.

Supply and Technical Support

Contact Us

Zeolyst International will be pleased to provide performance estimates for ATA-12 catalyst. Zeolyst provides start-up assistance and operational advice. Immediately after start-up the operation conditions will be fine-tuned together with the operational staff. The catalyst performance will be monitored and during normal operation six-months reviews will be held at the site, and following review operational advice will be given. A telephone help-desk is available.

Z-700A

Paraffin Isomerization Catalyst

Zeolyst Z-700A is a Pentane/Hexane isomerization catalyst based on the technology of the originators of the HYSOM catalyst. Applying sophisticated catalyst manufacturing technology, Z-700A is specifically designed for isomerization of pentane and hexane to high octane number branch chain hydrocarbons and combines an additional functionality for the saturation of benzene.

Applications

Z-700A is recommended for use in refineries and petrochemical complexes when the isomerization of pentane and hexane is required to produce a high-octane gasoline blending component. Performance tests of Z-700A have demonstrated its resilience to sulphur poisoning and a successful recovery from such incidents. The Z-700A can be used in all reactor types utilised for this process: classical fixed bed reactors, radial flow reactors, etc.

Feeds

Typical feeds processed over Z-700A are hydrotreated light straight run streams or normal paraffins from a recovery unit. The Z-700A catalyst has excellent resistance to poisoning by sulfur excursions from feed contaminants. Customers like the robustness and forgiving nature of the Z-700A catalyst, because the main factors in catalyst deactivation are impurities and heavy components in the feed. Average catalyst life is typically ten years.

The Zeolyst Z-700A also shows no adverse performance effects when utilising make-up hydrogen containing ppm levels of CO/CO₂.

Selectivity / Yields

Zeolyst Z-700A selectivity is higher than that of other commercially available pentane/hexane isomerization zeolite based catalysts. The Zeolyst Z-700A catalyst will produce a higher octane-barrel yield versus competitor catalysts. The activity decline is slow and long cycle lengths are expected, but of course cycle length depends also on feedstock, operating severity and unit constraints.

Regeneration

During operation catalyst activity slowly declines mainly because of coke lay-down. The activity can be restored to a large extent by carbon burn-off. This can be done in-situ; however, ex-situ is preferred because of the better temperature control.

Supply and Technical Support *Contact Us*

CRI is the world wide sales agent for Zeolyst catalysts and will be pleased to provide performance estimates for Z-700A catalyst prepared by Zeolyst International. Zeolyst provides start-up assistance and operational advice. Immediately after start-up the operation conditions will be fine-tuned together with the operational staff. The catalyst performance will be monitored and during normal operation six months reviews will be held at the site, and following review operational advice will be given

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