

Catalyst for Cyclohexane Dehydrogenation to Benzene

APPLICATION

Cyclohexane dehydrogenation to benzene is an important industrial process widely used in the petrochemical industry. This reaction converts cyclohexane (C₆H₁₂) into benzene (C₆H₆) by removing hydrogen molecules. Cyclohexane, typically derived from naphtha or refinery streams, is first purified to eliminate impurities that could deactivate the catalyst. The purified cyclohexane is preheated before entering the reactor. The reaction equilibrium favors benzene formation at high temperatures; however, excessively high temperatures can result in undesirable side reactions.

The benzene produced through cyclohexane dehydrogenation serves as a critical intermediate in the chemical industry.

DESCRIPTION

DELION's dehydrogenation catalyst is specifically designed for the fixed-bed process and incorporates a proprietary alumina support. The catalyst exhibits high activity, enabling the efficient dehydrogenation of cyclohexane to benzene at moderate temperatures and pressures. This ensures a conversion rate of at least 90% per pass while minimizing side reactions.

The catalyst demonstrates enhanced hydrothermal stability, providing a service life of at least two years. It offers a cycle duration of several months without requiring regeneration, maintaining a selectivity of over 99% toward benzene. By combining high activity, exceptional selectivity, and outstanding stability under operating conditions, the catalyst delivers superior performance. Additionally, it features high resistance to deactivation, excellent mechanical properties, and cost-effectiveness through its extended service life.

PHYSICAL & CHEMICAL PROPERTIES

Parameter	Unit	Specification
Form	-	sphere
Color	-	light grey
Mean diameter	mm	2.8
Bulk Density	g/ml	0.50
Crushing Strength	N/cm	>40
Al ₂ O ₃	%	>99.5
Active component		Pt

PROCESS CONDITIONS & PERFORMANCE

Element	Unit	Specification
Pressure	barg	0.2-0.5
Temperature	°C	280-340
WHSV	kg _{feed} /kg _{catalyst} ×h	0.5-1.0
Catalyst life	years	>2
Cyclohexane conversion	%	>90
Benzene selectivity	%	>99