

# Lean NOx Trap

## NOx emissions control solutions

Lean NOx Traps (LNT), also known as NOx adsorbers, can control NOx (nitrogen oxides) emissions from lean burn gasoline or diesel engines.

### Technology

The LNT technology combines three active components:

- Oxidation catalyst - platinum (Pt)
- Adsorbent - barium and/or other oxides
- Reduction catalyst - rhodium (Rh)

### Operation

The adsorbers, which are incorporated into the catalyst washcoat, chemically bind NOx during lean engine operation. When the adsorber capacity is saturated, the system is regenerated during a period of rich engine operation, and the released NOx is reduced to nitrogen (N<sub>2</sub>) over the catalyst.

The overall cycle of operation is:

- NO reacts with oxygen on active oxidation catalyst sites to form NO<sub>2</sub>.

Adsorption of NO<sub>2</sub> by the storage material in the form of barium nitrate.

- Once exhaust is switched to the rich condition, oxygen is replaced by reducing species, including hydrocarbons, carbon monoxide (CO), and hydrogen (H<sub>2</sub>).
- When the engine runs under excessive fuel conditions or at elevated temperatures the nitrate species become thermodynamically unstable and decompose, producing NO or NO<sub>2</sub>.
- Under rich conditions, the nitrogen oxides are reduced to N<sub>2</sub> over the reduction catalyst.

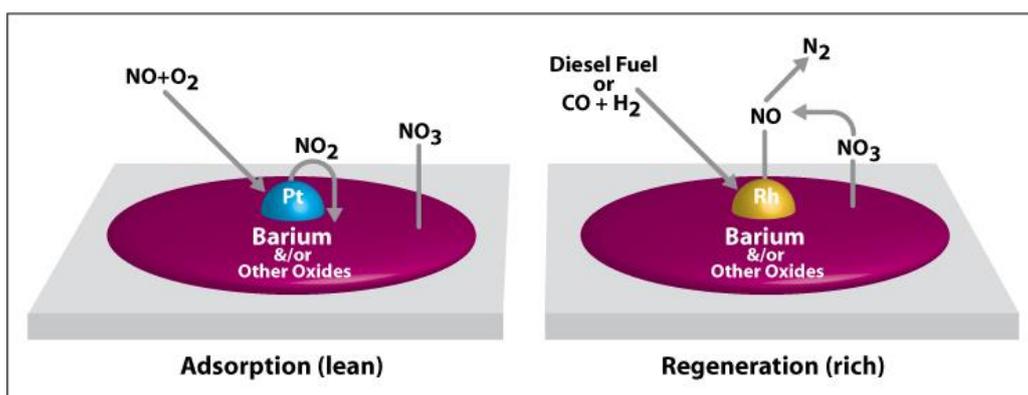
### Benefits

The advantages of BASF's LNT technologies include:

- High NOx removal activity
- Low light-off temperature
- Cost-effective emissions control

### SCR

BASF has also developed advanced SCR (Selective Catalytic Reduction) technologies for NOx removal, providing more options to meet challenging emission requirements.



## About Us

BASF's Catalysts division is the world's leading supplier of environmental and process catalysts. The group offers exceptional expertise in the development of technologies that protect the air we breathe, produce the fuels that power our world and ensure efficient production of a wide variety of chemicals, plastics and other products, including advanced battery materials. By leveraging our industry-leading R&D platforms, passion for innovation and deep knowledge of precious and base metals, BASF's Catalysts division develops unique, proprietary solutions that drive customer success.

**BASF - We create chemistry**

### Americas

BASF Corporation  
25 Middlesex/Essex Turnpike  
Iselin, New Jersey, 08830, USA  
Tel : +1-732-205-5000  
Fax: +1-732-205-7725  
Email: [catalysts-america@basf.com](mailto:catalysts-america@basf.com)

### Asia Pacific

BASF (China) Company Limited  
300 Jiang Xin Sha Road,  
Pudong, Shanghai 200137  
P.R. China  
Tel: +86-21-2039 2549  
Fax: +86-21-2039 4800-2549  
Email: [catalysts-asia@basf.com](mailto:catalysts-asia@basf.com)

### Europe, Middle East, Africa

BASF SE  
67056 Ludwigshafen, Germany  
Tel: +49-621-60-21153  
Fax: +49-621-60-43023  
Email: [catalysts-europe@basf.com](mailto:catalysts-europe@basf.com)



Although all statements and information in this publication are believed to be accurate and reliable, they are presented gratis and for guidance only, and risks and liability for results obtained by use of the products or application of the suggestions described are assumed by the user. NO WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH. Statements or suggestions concerning possible use of the products are made without representation or warranty that any such use is free of patent infringement and are not recommendations to infringe any patent. The user should not assume that toxicity data and safety measures are indicated or that other measures may not be required. © 2019 BASF