



Technology Readiness Level: **6**
System/Subsystem Model or Prototype Demonstration
in a Relevant environment

Tech Brief

New Catalyst Shows Superior Performance, Sulfur Tolerance to Diesel Exhaust

Pollution control technology for use with off-road diesel sources

Passive-Lean-NO_x

- Reagentless: does not require supplemental fuel or urea
- Low cost: less expensive than existing controls
- Simple: needs only a converter canister downstream of engine
- Sulfur tolerant: tolerates up to 1,000 ppm SO₂ under simulated conditions
- Destroys other pollutants, including unburned hydrocarbons and CO
- Effective: addresses Tier 3 and some Tier 4 standards for off-road engine exhaust-down to 0.7g NO_x/bhp·h without other emission controls.
- Optimal performance under moderate conditions: 150-250°C although it also operates well in a wide temperature window (100-500°C)

The Problem

Diesel Exhaust is dirty and expensive to clean up. Regulations are tightening for on and off road diesel emissions.

The Solution

Eltron has developed a catalyst for exhaust after treatment that is reagentless (i.e., does not use ammonia) and sulfur oxides insensitive. The catalyst is a passive, lean NO_x catalyst that functions by using exhaust-borne, unburned hydrocarbons to reduce NO_x.

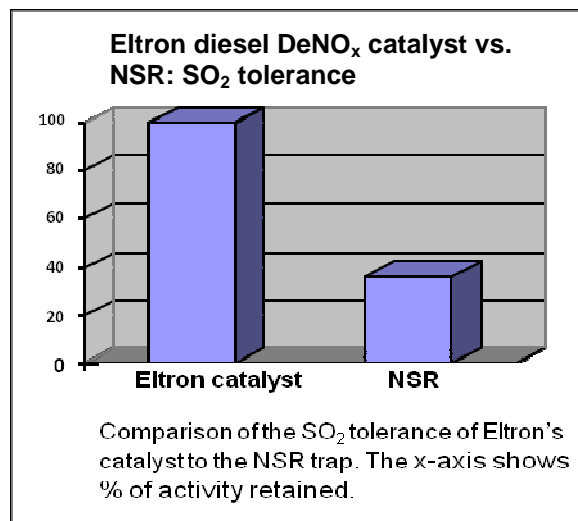
Performance demonstrated shows that it is superior to that of competing passive, lean NO_x catalysts (Eltron has consistently obtained 70+% in simulated exhaust and 60+% NO_x removal in diesel exhaust) and that its sulfur tolerance is markedly superior to that of NSR (NO_x storage-release) traps. At only 25 ppm, the NSR loses approximately 60 percent of its activity, becoming significantly less active than the Eltron material. At a much higher SO₂ concentration (1,000 ppm), the Eltron catalyst demonstrates no loss of activity.

The novel catalyst is incorporated into a converter or canister, and does

not require supplementation of exhaust borne oxidizable species with fuel or urea.

Features and Benefits

The catalyst has been tested under both laboratory and real-world, diesel exhaust conditions. In the lab tests, performance exceeded that of competing strategies under similar conditions. In diesel engine testing, >60% NO_x removal was observed without measurable formation of N₂O. Furthermore, Eltron's catalyst destroys other pollutants including unburned hydrocarbons and CO.





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Eltron's cost-effective methodology includes incorporating the catalyst onto a ceramic or metal monolithic support, which is encased in a converter canister that is integrated into the exhaust system. Due to the inexpensive materials used, a system employing Eltron's catalyst will be approximately 75 percent less expensive than currently available control technologies.

The catalyst works under moderate conditions of 150°C-250°C. Performance data shows that it is capable of addressing Tier 3 and even some Tier 4 standards for off-road diesel exhaust sources. Eltron's catalyst enables the use of any available fuel including sources with high sulfur levels. This is an important need for the military and other off-road applications. Commercial applications include construction machinery, generators, and marine incinerators.

Eltron's catalyst protects the environment by reducing harmful emissions and they help ease the burden of meeting increasingly more stringent exhaust standards.

Stage of Development

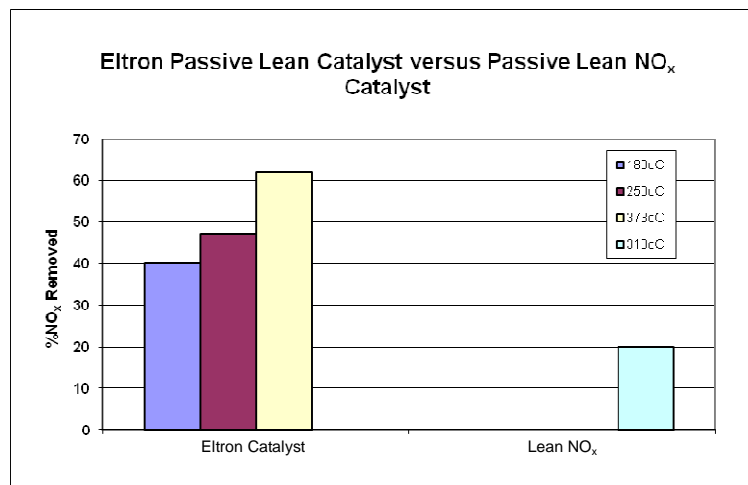
Supported and unsupported catalyst samples are available for 3rd party testing. Eltron has patents in process pertaining to this technology.

The technologies described, and all related inventions are owned by Eltron Research & Development, Inc. and protected by copyrights, trademarks, issued and pending patents, trade secrets, or other applicable intellectual property rights.

Contact Us

To discuss the possibility of entering into a business relationship with Eltron, contact the Business Development Group at business@eltronresearch.com.

To learn more about Eltron Research & Development's catalysts and the many other technologies that the company is researching and commercializing, visit www.eltronresearch.com.



Activity of Eltron catalyst supported on fecralloy monolith in diesel engine exhaust (at GHSV = 150,000h⁻¹ at 180 and 250°C, 115,000h⁻¹ at 373°C) versus the overall performance of lean NO_x catalyst. GHSV = 150,000h⁻¹.



Eltron Research & Development, Inc.

Eltron research & Development, Inc commercializes novel technologies involving energy, chemicals, advanced materials and environmental systems.

4600 Nautilus Court South | Boulder, CO 80301 | 303-530-0263 | www.eltronresearch.com
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