

FORM 2

THE PATENTS ACT, 1970
(39 of 1970)
AND
THE PATENTS RULES, 2003

**COMPLETE
SPECIFICATION**

(See Section 10; rule 13)

TITLE OF THE INVENTION

“CATALYST FOR TREATING EXHAUST GAS”

APPLICANT

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The following specification particularly describes
the invention and the manner in which
it is to be performed

CLAIMS

1. A catalyst composition comprising:
 - a. a zeolite material having a small-pore framework and a silica to alumina mole ratio (SAR) of about 10 to about 30;
 - b. about 1.5 to about 5 weight percent of an exchanged non-aluminum transition metal, based on the total weight of the zeolite; and
 - c. at least about 1.35 weight percent of cerium, based on the total weight of the zeolite, wherein said cerium is present in a form selected from exchanged cerium ions, monomeric ceria, oligomeric ceria, and combinations thereof, provided that said oligomeric ceria has a particle size of less than 5 μm .
2. The catalyst of claim 1, wherein the composition comprises about 2 to about 3.5 weight percent of an exchanged non-aluminum transition metal, based on the total weight of the zeolite.
3. The catalyst of claim 1, wherein the composition comprises about 2 to about 3 weight percent of an exchanged non-aluminum transition metal, based on the total weight of the zeolite.
4. The catalyst of claim 1, wherein the composition comprises about 2 to about 2.5 weight percent of an exchanged non-aluminum transition metal, based on the total weight of the zeolite.
5. The catalyst of claim 1, wherein the non-aluminum transition metal is copper.
6. The catalyst of claim 6, wherein said copper is present in a Cu:Al ratio of about 0.17 to about 0.24.
7. The catalyst of claim 1, wherein the composition comprises about 1.35 to about 13.5 weight percent of cerium, based on the total weight of the zeolite.

8. The catalyst of claim 1, wherein the composition comprises about 2.7 to about 8.1 weight percent of cerium, based on the total weight of the zeolite.
9. The catalyst of claim 1, wherein the zeolite has a CHA Framework Type Code.
10. The catalyst of claim 9, wherein the zeolite is an aluminosilicate and has an SAR of about 15 to about 20.
11. The catalyst of claim 10, wherein the zeolite is SSZ-13.
12. The catalyst of claim 5, wherein said zeolite is an aluminosilicate having a CHA Framework Type Code and an SAR of about 15 to about 20.
13. The catalyst of claim 12, wherein said copper is present in a Cu:Al ratio of about 0.17 to about 0.24.
14. The catalyst of claim 1, wherein said composition is substantially free of Zr, ZrO, Ti, and TiO
15. A method for treating NO_x comprising contacting an exhaust gas produced by a lean-burn combustion engine with a catalyst according to any of claims 1 – 10 at a temperature of about 200 to about 550° C for a period of time necessary to achieve a NO_x conversion of at least about 70%.
16. A catalyst composition comprising:
 - a. a zeolite material having a small-pore framework and a silica to alumina mole ratio (SAR) of about 10 to about 30;
 - b. about 80 to about 120 g/ft³ of an exchanged non-aluminum transition metal; and
 - c. at least about 50 g/ft³ of cerium, wherein said cerium is present in a form selected from exchanged cerium ions, monomeric ceria, oligomeric ceria, and combinations thereof, provided that said oligomeric ceria has a particle size of less than 5 µm.

Dated this 27 day of June 2014

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