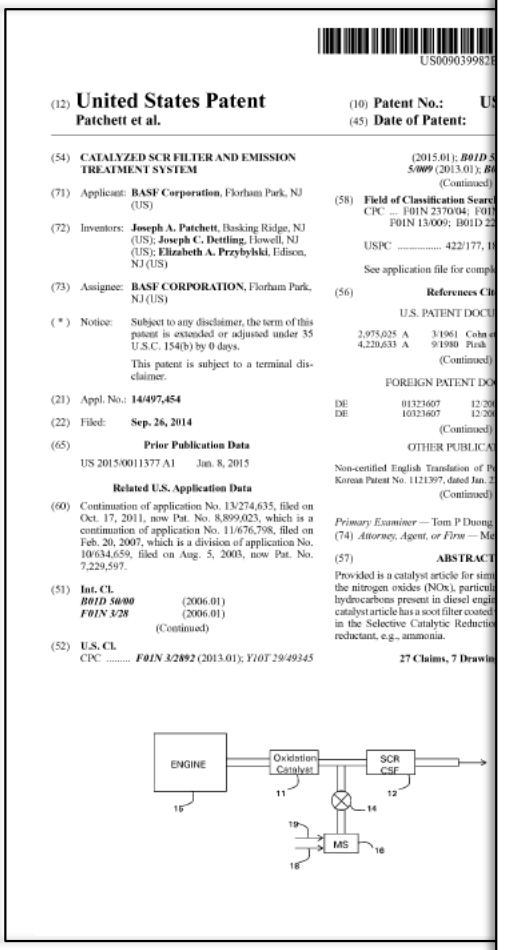
Johnson Matthey Inc. & Johnson Matthey PLC v. BASF Corporation

IPR2015-01265, 01266, & 01267

August 23, 2016 Oral Hearing

Petitioner's Presentation

‘982 Patent, Claim 1



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(12) **United States Patent**
Patchett et al.

(10) **Patent No.:** US

(45) **Date of Patent:**

(54) **CATALYZED SCR FILTER AND EMISSION TREATMENT SYSTEM**

(71) Applicant: **BASF Corporation**, Florham Park, NJ (US)

(72) Inventors: **Joseph A. Patchett**, Basking Ridge, NJ (US); **Joseph C. Dettling**, Howell, NJ (US); **Elizabeth A. Przybylski**, Edison, NJ (US)

(73) Assignee: **BASF CORPORATION**, Florham Park, NJ (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/497,454**

(22) Filed: **Sep. 26, 2014**

(65) **Prior Publication Data**

US 2015/0011377 A1 Jan. 8, 2015

Related U.S. Application Data

(60) Continuation of application No. 13/274,635, filed on Oct. 17, 2011, now Pat. No. 8,899,023, which is a continuation of application No. 11/676,798, filed on Feb. 20, 2007, which is a division of application No. 10/634,659, filed on Aug. 5, 2003, now Pat. No. 7,229,597.

(51) **Int. Cl.**
B01D 50/00 (2006.01)
F01N 3/28 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ..... ***F01N 3/2892*** (2013.01); *Y10T 29/49345* (2015.01); ***B01D 5/0009*** (2013.01); ***B***
(Continued)

(58) **Field of Classification Searc**
CPC ... F01N 2370/04; F01
F01N 13/009; B01D 22
USPC 422/177, 1
See application file for compl

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Primary Examiner — Tom P Duong
(74) *Attorney, Agent, or Firm* — Me

(57) **ABSTRACT**

Provided is a catalyst article for simu
the nitrogen oxides (NOx), particul
hydrocarbons present in diesel engi
catalyst article has a soot filter coated
in the Selective Catalytic Reductio
reductant, e.g., ammonia.

27 Claims, 7 Drawin

1. A catalyst article consisting essentially of a w
monolith and a catalytic material, wherein the w
monolith has a plurality of longitudinally extending p
formed by longitudinally extending walls bound
defining said passages, wherein the passages compr
passages having an open inlet end and a closed outlet
outlet passages having a closed inlet end and an ope
end, the wall flow monolith has a porosity of from
60% and an average pore size of from 10 to 25 micr
the wall flow monolith contains the catalytic materia
wherein the catalytic material comprises an SCR
composition including a slurry-loaded washc
zeolite and base metal selected from copper, th
coat permeating the walls at a loading up to 2.4 g
wall flow monolith having integrated, NOx and
late removal efficiency in which presence of the
material in the wall flow monolith catalyzes th
tion of soot.

The ’709 and ’023 Patents

’709 Patent

1. A method for treating emissions produced in an exhaust stream from a diesel engine comprising NOx and particulate matter, the method comprising:

(a) passing the exhaust stream through an oxidation catalyst wherein a substantial portion of NO is oxidized to NO_2 to provide an NO_2-enriched exhaust stream;

(b) metering at periodic intervals, ammonia or an ammonia precursor into the NO_2-enriched exhaust stream; and,

(c) subsequently passing the exhaust stream containing ammonia through a wall flow monolith wherein particulate matter is filtered and a substantial portion of NOx is reduced to N_2;

wherein the wall flow monolith has a plurality of longitudinally extending passages formed by longitudinally extending walls bounding and defining said passages, wherein the passages comprise inlet passages having an open inlet end and a closed outlet end, and outlet passages having a closed inlet end and an open outlet end, the wall flow monolith having a porosity of from 50% to 60% and an average pore size of from 10 to 25 microns

wherein the wall flow monolith comprises a washcoat of SCR catalyst composition that permeates the walls, the SCR catalyst composition comprising a zeolite and base metal component selected from one or more of a copper and iron component, the washcoat permeating the walls at a loading up to 2.4 g/in^3, the wall flow monolith having integrated, NOx and particulate removal efficiency in which presence of the catalytic material in the wall flow monolith catalyzes the oxidation of soot.

’023 Patent

1. An emission treatment system for tre
exhaust stream comprising NOx and particula
emission treatment system comprising: a) an o
lyst; b) an injector in fluid communication wi
stream of the oxidation catalyst, wherein the inj
cally meters ammonia or an ammonia precu
exhaust stream; and c) an SCR catalyst artic
essentially of a wall flow monolith and catalyti
wall flow monolith in fluid communication wi
stream of the injector, wherein the wall flow m
plurality of longitudinally extending passages f
gitudinally extending walls bounding and defi
sages, wherein the passages comprise inlet pa
an open inlet end and a closed outlet end, and o
having a closed inlet end and an open outlet end
monolith having a porosity of from 50% to
average pore size of from 10 to 25 microns, and
monolith contains the catalytic material compr
catalyst composition including a slurry-loaded
zeolite and base metal selected from one or mo
and iron component, the washcoat permeating
loading up to 2.4 g/in^3, the wall flow monolit
grated, NOx and particulate removal efficiency
ence of the catalytic material in the wall flow m
lyzes the oxidation of soot.

The claims are obvious over **Hüthwohl** (JM 1005), **Sperone** 1008), **Hashimoto** (JM 1007), and **Teraoka** (JM 1009).

- **Hüthwohl** taught combining an SCR catalyst with a wall-flow fi that loading the SCR catalyst into the wall-flow filter saved spac still reducing NOx and PM emissions.
- The **Speronello** catalysts were "one of the best, most stable SC catalysts" and well-suited for use in wall-flow filters.
- The **Hashimoto** filters were able to accommodate a catalyst loa 100 g/L (1. 64 g/in^3), the same loading as Speronello, and still acceptable back-pressure.

Hüthwohl Built, Tested, and Recommended a System Loaded an SCR Catalyst into a Wall-Flow Filter.

Hüthwohl Even Recommending Putting the SCR-Catalyzed Wall-Flow Filter into Everyday Service in Buses.

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