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

IPR2015-01265, 01266, & 01267 August 23, 2016 Oral Hearing Petitioner's Presentation



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'982 Patent, Claim 1

 CALALYZED SCR FILTER AND EMISSION TREATMENT SYSTEM Applicate: BASF Corporation, Florham Park, NJ (05) Inventors: Joseph A. Partchett, Basking Ridge, NJ (05) Inventors: Joseph A. Partchett, Basking Ridge, NJ (05) Ausignee: BASF CORPORATION, Florham Park, NJ (05) Ausignee: BASF CORPORATION, Florham Park, NJ (05) Notice: Subject to any disclaimer, the term of this patent is estanded or adjusted under 35 U.S.C. 154(b) b9 (days. This patent is subject to a terminal dis- claimer. Appl. No: 14497,454 Filed: Sep. 26, 2014 Filed: Sep. 26, 2014 Related US, Application Data US 20150011377 Al. Jan. 8, 2015 Related US, Application Data Oct. 17, 2011, now Pat. No. 8899(23), which is al origoniation No. 107634,559, filed on Aug. 5, 2003, now Pat. No. 17,223,937 In C.C. BBDJ 5609 (2006.01) FBIJ 5609 (2	CPCF0IN 237004; Ft F0IN 13000; F0IN 1500; F0IN 150
 (US) (US) Inventor: Joseph A. Patchett, Basking Ridge, NJ (US): <i>Listoph C</i>. Detting, Howell, NJ (US): <i>Elistoph A</i>. Przybyłski, Editoca, NJ (US) Nosigene: RASF CORFORATION, Floritam Park, NJ (US) Notice: Subject to any disclaimer, the term of this patent is establed or adjusted under 35 U.S.C. 154(b) by 0 days. This patent is subject to a terminal disclaimer. Appl. No: 144097,454 Filed: Sep. 26, 2014 Prior Publication Data US 20150011377 Null. Jan. 8, 2015 Related US, Appleation Data Octification of application Data Octification of application of papilication No. 10/05/35, filed on Continuation of application and the internet of the 20, 2007, which is a direction of application No. 10/05/34,559, filed on Aug. 5, 2003, now Pat. No. 7, 229, 597. Int. CL Bith Seque (2006.01) (Continued) US. CL 	(58) Field of Classification Sec CRC Field of Classification Sec CRC Field N 237004; H F01N 130009; B01D USPC
(US), Joseph C. Dettling, Elsweil, NJ (US), Joseph C. Dettling, Elsweil, NJ (US), Elizabeth A. Przybykski, Edison, NJ (US) Subject to any disclaimer, the term of this US.C. 154(b) by 0 days. This patent is available or adjusted much 1ds US.C. 154(b) by 0 days. This patent is subject to a terminal dis- claimer. Subject 1 or adjusted much 1ds US 2015/0011377 AI Jun. 8, 2015 Related US. Application Data US 2015/0011377 AI Jun. 8, 2015 Related US. Application Data Continuition of application No. 11/076.708, filed on Oct. 17, 2011, now Pat. No. 8, 829/023, which is a continuition of application No. 11/076.708, filed on Oct. 17, 2011, now Pat. No. 8, 2005, now Pat. No. 10/034459, 2020, which is a division of application No. 10/034459, 2020, 10/07, which is a division of application No. 10/034459, 2020, 2020, now Pat. No. 10/03459, 2020, 2020, 1020,	USPC
NJ (US) 3) Assignce: BASF CORPORATION, Florham Park, NJ (US) 3) Notice: Subject to any disclatmer, the term of this potent is southoff or englasted under 35 U.S.C. 154(b) by 0 days. This patent is studject to a terminal dis- claimer. 21) Appl. No.: 144097,454 22) Filed: Sep. 26, 2014 65) Prior Publication Data US 20150011377 A1 Jan. 8, 2015 Related US. Application Data US 20150011377 A1 Jan. 8, 2015 Related US. Application Data 0) Continuation of application No. 11/2674,055, filed on Oct. 17, 2011, num. Pt. No. 8, 889023, which is a continuation of application No. 11/2674,058, filed on Oct. 17, 2011, num. Pt. No. 8, 889023, which is in a continuation of application No. 11/2674,058, filed on Oct. 17, 2015 Jan. 8, 2003, now Pat. No. 7,229,997. 31) Int. CL B01D 56000 (2006.01) (Continued) (Continued)	(56) References C U.S. PATENT DOC 2,675,023 A 31661 Coh 4,220,033 A 31630 Fold Cominue Cominue 01300 Fold Cominue FOREIGN PATENT D 1023,667 12; Cominue DE 1023,667 12; Cominue OTHER PUBLIC Cominue Cominue Nun-cetifielt flequids Taxonfation of Karoan Patent No. 1121397, dated Im (Cominue Cominue Primary Examiner — Tame Polsa (Cominue Primary Examiner — Tame Polsa (Cominue) V(74) Attorney, Agent, or Firm — N Cominue
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51) Int. CL. B01D 5000 (2006.01) F01N 328 (2006.01) (Ccontinued) 52) U.S. CL.	(57) ABSTRAC
	Provided is a catalyst article for sit the nitrogen oxides (NOx), partice hydrocarbons present in diesel eng catalyst article has a soot filter coate in the Selective Catalytic Reduct reductant, e.g., anamonia.
	27 Claims, 7 Draw
ENGINE 15 15 15 11 15	

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1. A catalyst article consisting essentially of a weight and a catalytic material, wherein the weight monolith has a plurality of longitudinally extending provide the provide by longitudinally extending walls bound defining said passages, wherein the passages comproprises having an open inlet end and a closed outlet outlet passages having a closed inlet end and an open end, the wall flow monolith has a porosity of from 60% and an average pore size of from 10 to 25 micro the wall flow monolith contains the catalytic material wherein the catalytic material comprises an SCR.

composition including a slurry-loaded washed zeolite and base metal selected from copper, the 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 the 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 NO₂ to provide an NO₂-enriched exhaust stream;
- (b) metering at periodic intervals, ammonia or an ammonia precursor into the NO₂-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 N₂;
- 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/in³, 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 with stream of the oxidation catalyst, wherein the inf cally meters ammonia or an ammonia precu exhaust stream; and c) an SCR catalyst artic essentially of a wall flow monolith and catalytic wall flow monolith in fluid communication w stream of the injector, wherein the wall flow n 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 comp 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/in³, the wall flow monolit grated, NOx and particulate removal efficiency ence of the catalytic material in the wall flow r lyzes the oxidation of soot.

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The claims are obvious over <u>Hüthwohl</u> (JM 1005), <u>Sperone</u> 1008), <u>Hashimoto</u> (JM 1007), and <u>Teraoka</u> (JM 1009).

- <u>Hüthwohl</u> taught combining an SCR catalyst with a wall-flow fi that loading the SCR catalyst into the wall-flow filter saved space still reducing NOx and PM emissions.
- The <u>Speronello</u> catalysts were "one of the best, most stable So catalysts" and well-suited for use in wall-flow filters.
- The <u>Hashimoto</u> filters were able to accommodate a catalyst loat 100 g/L (1. 64 g/in³), 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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