No. 2016-1770

United States Court Of Appeals for the Federal Circuit

BASF CORPORATION,

***Plaintiff-Appellant*,**

v.

JOHNSON MATTHEY INC.,

***Defendant-Appellee*,**

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE, CASE NO. 1:14-CV-01204-SLR-SRF, JUDGE SUE L. ROBINSON

APPELLEE'S RESPONSE BRIEF

Douglas E. McCann
Martina Tyreus Hufnal
Robert M. Oakes
Patrick D. Cooney
FISH & RICHARDSON P.C.
222 Delaware Ave, 17th Floor
Wilmington, DE 19801
Telephone: 302-652-5070
dmcann@fr.com
rmoakes@fr.com
hufnal@fr.com
cooney@fr.com

Attorney for Plaintiff-Appellant
Johnson-Matthey, Inc.

January 19, 2017

CERTIFICATE OF INTEREST

Counsel for appellee Johnson Matthey Inc. certifies the following:

1. The full name of every party or amicus represented by me is:

Johnson Matthey Inc.

2. The name of the real party in interest (if the party named in the caption is not the real party in interest) represented by me is:

Johnson Matthey Inc.

3. All parent corporations and any publicly held companies that own 10% or more of the stock of the party or amicus curiae represented by me are:

Johnson Matthey PLC

4. The names of all law firms and the partners or associates that appeared for the party or amicus now represented by me in the trial court or are expected to appear in this court are:

Fish & Richardson P.C.: Douglas McCann, Martina Hufnal, Robert Oakes, Patrick Cooney, Warren Mabey, Lealon Martin

/s/ *Douglas E. McCann*
Douglas E. McCann

Dated: January 19, 2017

TABLE OF CONTENTS

STATEMENT OF RELATED CASES vii

STATEMENT OF THE ISSUE 1

INTRODUCTION 1

STATEMENT OF THE FACTS 3

A. Systems to Reduce NOx Emissions from Diesel Engine Emissions. ... 3

B. The '185 Patent Claims a Known Arrangement of an SCR Catalyst and AMOx Catalyst Using Functional Terms to Identify the Catalysts. 5

1. The Exemplary Catalyst Arrangement Shown in the '185 Patent Was Already Well-Known by Johnson Matthey and Others. 5

2. The Claims Use Catalyst Function to Identify the Composition of the SCR Catalyst and of the AMOx Catalyst. 6

3. An Effectively Limitless Number of Compositions Display Some Degree of Catalyst Function. 9

4. The Functional Terms Encompass—But Are Not Limited To—The Exemplary Compositions Disclosed in the Specification. 10

5. The Specification Evaluates Catalyst Function Using a Metric, "Conversion Percentage," That Depends Upon the Chosen Reaction Conditions. 11

6. The Specification Discloses That the Functional Terms Require Something More Than a Conversion Percentage of 6.3%–But Never Says How Much More. 14

C. The Proceedings Below. 18

SUMMARY OF ARGUMENT 22

STANDARD OF REVIEW 24

ARGUMENT 24

A. The '185 Patent Claims, Read in Light of the Specification, Fail to Define the Boundaries of the Functional Terms. 25

1. The Specification Discloses That the Functional Terms Require More Than an Infinitesimal Degree Catalyst Function—But Never Says How Much More. 26

2. The Extrinsic Evidence Corroborates That a Person of Ordinary Skill Would Read the Functional Terms as Requiring More Than a Minimal Degree of Catalyst Function. 32

3. BASF's Legal Argument About the Scope of Functional Terms Ignores the Context of the '185 Patent and of the Cases It Cites. 35

4. BASF Chose to Draft its Claims Ambiguously. 42

5. BASF Did Not Identify Any Disputed Material Facts to the District Court and Still Does Not Here. 44

B. The '185 Patent Discloses Numerous Ways to Measure Catalyst Function, Each Giving Different and Potentially Outcome-Determinative Results. 45

1. The '185 Patent Discloses Multiple Outcome-Determinative Methods to Measure Catalyst Function and Offers No Guidance on Which to Use. 47

2. BASF Has Conceded the Material Facts Demonstrating That the Functional Terms Are Indefinite. 50

CONCLUSION 52

TABLE OF AUTHORITIES

Page(s)

Cases

Abbott Labs. v. Baxter Pharm. Prods,. Inc.,
334 F.3d 1274 (Fed. Cir. 2003) 36, 37

Andersen Corp. v. Fiber Composites, LLC,
474 F.3d 1361 (Fed. Cir. 2007) 41

BASF Corporation v. Johnson Matthey, Inc.,
No. 14-1204 (D. Del. Dec. 8, 2014) 21

Biosig Instruments, Inc. v. Nautilus, Inc.,
783 F.3d 1374 (Fed. Cir. 2015) 19, 24, 51

In re Caldwell,
319 F.2d 254 (CCPA 1963) 36, 37

Cox Commc'ns, Inc. v. Sprint Commc'n Co.,
838 F.3d 1224 (Fed. Cir. 2016) 41

Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.,
424 F.3d 1293 (Fed. Cir. 2005) 38, 39

Dow Chem. Co. v. Nova Chemicals Corp. (Canada),
803 F.3d 620 (Fed. Cir. 2015) 46, 51

Dow Chem. Co. v. Nova Chemicals Corp. (Canada),
809 F.3d 1223 (Fed. Cir. 2015) (Moore, J., concurring in denial of
petition for rehearing en banc).....52

Eaton Corp. v. Rockwell Int'l Corp.,
323 F.3d 1332 (Fed. Cir. 2003) 40

Geneva Pharms., Inc. v. GlaxoSmithKline PLC,
349 F.3d 1373 (Fed. Cir. 2003) 36, 37

Halliburton Energy Services, Inc. v. M-I LLC,
514 F.3d 1244 (Fed. Cir. 2008) .....*passim*

Hill-Rom Servs., Inc. v. Stryker Corp.,
755 F.3d 1367 (Fed. Cir. 2014) 38, 39

In re Hoeksema,
332 F.2d 374 (CCPA 1964) 40

Honeywell Int'l, Inc. v. Int'l Trade Comm'n,
341 F.3d 1332 (Fed. Cir. 2003) 28, 45

Interval Licensing LLC v. AOL, Inc.,
766 F.3d 1364 (Fed. Cir. 2014) 26, 30, 35

Leggett & Platt, Inc. v. VUTEk, Inc.,
537 F.3d 1349 (Fed. Cir. 2008) 39

Markman v. Westview Instruments, Inc.,
517 U.S. 370 (1996).....26

Nautilus, Inc. v. Biosig Instruments, Inc.,
134 S. Ct. 2120 (2014).....25, 26, 32, 35

NTP, Inc. v. Research In Motion, Ltd.,
418 F.3d 1282 (Fed. Cir. 2005) 41

Perricone v. Medicis Pharm. Corp.,
432 F.3d 1368 (Fed. Cir. 2005) 40

In re Peterson,
136 F.2d 755 (CCPA 1943) 40

Phillips v. AWH Corp.,
415 F.3d 1303 (Fed. Cir. 2005) 26, 27

In re Prutton,
200 F.2d 706 (CCPA 1952) 40

Saler v. Hallock,
109 F.2d 254 (CCPA 1940) 40

SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.,
242 F.3d 1337 (Fed. Cir. 2001) 40

Scripps Clinic & Research Foundation v. Genentech, Inc.,
927 F.2d 1565 (Fed. Cir. 1991) 44

In re Smith,
458 F.2d 1389 (CCPA 1972) 40

Sonix Tech. Co., Ltd. v. Publ'ns Int'l, Ltd.,
--- F.3d ---, No. 2016-1449, 2017 WL 56321 (Fed. Cir. Jan. 5, 2017) 41, 42

In re Swinehart,
439 F.2d 210 (CCPA 1971) 38, 39, 42

In re Tanke,
213 F.2d 551 (CCPA 1954) 40

Teva Pharms. USA, Inc. v. Sandoz, Inc.,
789 F.3d 1335 (Fed. Cir. 2015) .....*passim*

Union Switch & Signal Co. v. Louisville Frog, Switch & Signal Co.,
73 F.2d 550 (6th Cir. 1934) 40

Statutes

35 U.S.C. § 112 .....*passim*

STATEMENT OF RELATED CASES

No appeal from this proceeding has previously been before this Court or any other court. Counsel for appellant Johnson Matthey, Inc. know of no other cases pending in this Court or any other court that will directly affect or be affected by this Court's decision in this appeal.

STATEMENT OF THE ISSUE

Whether the functional claim terms in U.S. Patent No. 8,524,185 are indefinite under 35 U.S.C. § 112, ¶ 2, where they attempt to define a critical claim limitation (the identity of the catalyst compositions), and the intrinsic evidence discloses that *some* degree of catalyst function is required, but never conveys to a skilled artisan *how much* catalyst function is needed or which of the disclosed outcome-determinative methods is used to measure catalyst function.

INTRODUCTION

The '185 patent uses functional terms to claim two catalysts, an "AMOx" catalyst and an "SCR" catalyst—*i.e.*, the catalyst compositions are defined by what they do rather than what they are. Nowhere, however, does the '185 patent define this critical claim limitation by informing a person of ordinary skill what level of catalyst function is needed or which of the disclosed outcome-determinative methods of measurement to use. The specification, rather than clarifying the scope of the functional terms, discloses that *something more than* an infinitesimal degree of catalyst function is needed, without ever defining how much more. The specification also teaches that the same composition can display one of the catalyst functions under certain conditions, yet display the other catalyst function under different conditions. While the specification discloses more than five outcome-determinative ways to measure SCR catalyst function and more than three outcome-

determinative ways to measure AMOx catalyst function, it never identifies which of those methods to use.

As the disclosure of the '185 patent provides no reasonable definition of these functional terms, it is not surprising that BASF spent little time in its opening brief discussing the specification and its examples; examples that contradict BASF's position that the functional terms encompass *any infinitesimal degree* of catalyst function. Instead, BASF resorted to general legal arguments. None of its cases, however, use functional claim language the same way that the '185 patent does: to define a critical claim limitation where the specification directly requires a threshold, but unspecified, degree of function. The functional terms here are so critical that, depending on their scope, they could cover an effectively limitless number of compositions. BASF has always struggled to reconcile the specification with a broad construction—even to the point of affirmatively criticizing to the district court the broad construction it now advocates to this Court. If the patentee did not even arrive at its current (and unsupported) position on its first attempt, there is no reason to think a person of ordinary skill would either. The district court should be affirmed.

STATEMENT OF THE FACTS

A. Systems to Reduce NOx Emissions from Diesel Engine Emissions.

Diesel engine exhaust contains pollutants. '185 patent, col. 1, lines 12-16. One class of pollutants is nitrogen oxides, or NOx. *Id.* at col. 1, lines 21-23. A proven way to lessen NOx emissions was to use a chemical process known as Selective Catalytic Reduction ("SCR"), where ammonia (NH_3) is injected into the exhaust stream and, with the aid of a catalyst composition, it reacts with NOx to produce innocuous nitrogen gas (N_2) and water. *Id.* at col. 1, lines 23-27.

The problem of "ammonia slip" arises when not all of the injected ammonia reacts with NOx, leaving the excess ammonia to exit the tailpipe. *Id.* at col. 1, lines 37-50. To combat ammonia slip, a second catalyst, known as an "ammonia oxidation catalyst" or "AMOx" catalyst can be placed downstream of the SCR catalyst to oxidize any unreacted ammonia. *Id*. at col. 2, lines 40-48. This catalyst is often a precious metal like platinum ("Pt"). *See id.* at col. 8, lines 11-24. Early AMOx catalysts comprised a single layer of a precious metal, such as platinum, applied to a substrate downstream of the SCR catalyst. Appx495, ¶ 8 ("Another strategy that can be used … is to include an [AMOx] catalyst downstream of the SCR catalyst."). These single-layer AMOx catalysts, however, were "unselective." That is, not only would the AMOx catalyst oxidize excess ammonia to innocuous nitrogen gas, it would also unselectively oxidize ammonia to NOx—the very

pollutant that ammonia is added to eliminate. '185 patent, col. 1, lines 55-56. Because they were "unselective," using single-layer AMOx to remove ammonia slip could actually increase NOx emissions.

More than three years before the priority date of the '185 patent, others in the industry had commercialized AMOx catalysts with a new, two-layer architecture that had improved selectivity—these catalysts removed excess ammonia without creating additional NOx in the exhaust stream. For example, in 2005, a company named Tokyo Roki had developed and sold an AMOx catalyst that had "better selectivity to N2 (rather than NOx)." Appx507. The improvement came from a two-layer architecture that put a top layer of an SCR catalyst over a bottom layer of the old, single-layer AMOx catalyst (like platinum). *See, e.g., id.* (the Tokyo Roki catalysts with improved selectivity had "a layer of SCR catalyst over a Pt layer"); *see also* Appx524; Appx586.

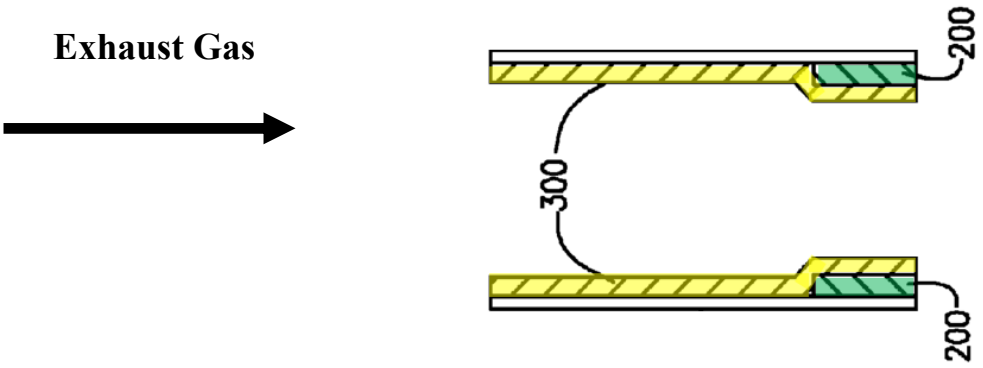
Johnson Matthey began commercializing two-layered AMOx catalysts by March 2006, *see* Appx626 & Appx674 (May 2006 Commercial Offer to Daimler), and "zoned" its new and improved two-layer AMOx catalyst on the same substrate as the upstream SCR catalyst. *See* Appx645 ("JM is able to zone coat an NH_3 slip catalyst onto the rear of the SCR catalyst brick."); *see also* Appx649-656 (offering for sale a "new, advanced" ammonia slip catalyst). By 2007 (and before the priority date of the patent-in-suit), Johnson Matthey had completed sales of its two-layer

AMOx catalyst "zone coated" on the same substrate as the SCR catalyst. *See* Appx370.

B. The '185 Patent Claims a Known Arrangement of an SCR Catalyst and AMOx Catalyst Using Functional Terms to Identify the Catalysts.

1. The Exemplary Catalyst Arrangement Shown in the '185 Patent Was Already Well-Known by Johnson Matthey and Others.

The '185 patent claims the already known arrangement of a two-layer AMOx catalyst applied downstream of an SCR catalyst on a single substrate. *See* '185 patent, claims 1 & 17. As described in the '185 patent, the AMOx catalyst is the undercoat layer, which starts at the outlet end and goes only part of the way across the length of the substrate. *Id.* The SCR catalyst is the overcoat layer and goes all the way across the length of the substrate. *Id.* The claimed arrangement is best seen by rotating Fig. 1(b) of the '185 patent by ninety degrees, where 200 (green) refers to the AMOx catalyst and 300 (yellow) refers to the SCR catalyst.



This arrangement—a first zone having a single-layer SCR catalyst followed by second zone having a SCR catalyst on top of an AMOx catalyst—is the same arrangement sold by Tokyo Roki in 2005, *see* Appx507 & Appx524, commercialized by Johnson Matthey starting in March 2006, *see* Appx649-651 & Appx674-676, and described multiple places in the prior art, *see*, *e.g.*, Appx268 at claim 8 (the Soeger reference, WO 2007/137675, claiming an "SCR catalyst … deposited over the entire length of the honeycomb body [that] covers the oxidation catalyst on the back part of the honeycomb body"). BASF's inventor admitted that he conceived of this already known architecture no earlier than January of 2008. *See* Appx806 at 279:21-280:7 (deposition testimony of inventor stating that he conceived of the subject matter of the '185 patent on January 9, 2008).

2. The Claims Use Catalyst Function to Identify the Composition of the SCR Catalyst and of the AMOx Catalyst.

Rather than claiming what catalyst compositions can be used as AMOx or SCR catalysts, the claims of the '185 patent recite what the catalyst compositions do—*i.e.*, the claims cover any and all compositions that display certain catalyst functions. *See, e.g.*, '185 patent, claim 1. For example, claim 1 defines the AMOx catalyst (called "material composition A") only as being "effective for catalyzing NH3 oxidation." Likewise, the SCR catalyst (called "material composition B") is defined only as "effective to catalyze selective catalytic reduction (SCR) of NOx." Claim 1 reads (with the functional terms emphasized):

> 1. A catalyst system for treating an exhaust gas stream containing NOx, the system comprising:
>
> at least one monolithic catalyst substrate having an inlet end and an outlet end; an undercoat washcoat layer coated on one the outlet end of the monolithic substrate and which covers less than 100% of the total length of the monolithic substrate, and containing a ***material composition A effective for catalyzing NH3 oxidation***;
>
> an overcoat washcoat layer coated over a total length of the monolithic substrate from the inlet end to the outlet end sufficient to overlay the undercoat washcoat layer, and containing a ***material composition B effective to catalyze selective catalytic reduction (SCR) of NOx***; and
>
> wherein material composition A and material composition B are maintained as physically separate catalytic compositions.

The claim does not give any further instruction on how to determine whether either composition is effective for catalyzing the identified reaction.

Claim 5, which depends from claim 1, uses a similar functional term, specifying that "material composition A," the AMOx catalyst, "also contains a material composition further effective to catalyze SCR of NOx."

Claim 17, the only independent claim other than claim 1 in the '185 patent, also uses functional language when reciting the AMOx and SCR catalysts. To be sure, claim 17 defines the AMOx catalyst, *i.e.* "material composition A," not only by what it does, but also by what it is. Specifically, claim 17 recites (for the AMOx catalyst) "a material composition A ***comprising a precious metal*** effective for

catalyzing NH3 oxidation."[1] (Emphasis added.) But claim 17 is still flawed—it defines the SCR catalyst as "a material composition B free from precious metal effective for catalyzing selective catalytic reduction (SCR) of NOx." Though this term says what composition B is ***not***, it still relies only on catalyst function to identify what composition B ***is***.

Some of the dependent claims limit "material composition A" or "material composition B" to specific catalysts. For example, claim 14 limits "material composition A," the AMOx catalyst, to a broad range of compositions that comprise a "precious metal component dispersed on support particles." *Id.* at claim 14. Claim 15 further narrows what the support particles comprise, and claim 16 narrows what the precious metal comprises. Similarly, claims 6-13 limit "material composition B," the SCR catalyst, to certain broad classes of compositions, including to compositions having "a zeolitic or non-zeolitic molecular sieve," *see* claim 6, or compositions that "contain[] a metal from one of the groups VB, VIIB, VIIB, VIIIB, IB, or IIB of the periodic table distributed on or within the molecular sieve, the metal being present in an amount between 0.1% and 10% by wt. of the molecular sieve," *see* claim 10. However, no dependent claim provides a definite structure to *both* "material composition A" *and* "material composition B"—for every claim, at least

[1] Johnson Matthey has not alleged that this term (composition A of claim 17), which specifically recites the composition comprises a precious metal, is indefinite.

one of the two terms is defined only by whether it is effective to catalyze a particular reaction.

3. An Effectively Limitless Number of Compositions Display Some Degree of Catalyst Function.

An effectively limitless number of compositions display some degree of AMOx or SCR catalyst function, including even the exhaust pipe itself.

With respect to AMOx catalyst function, "[m]ost any material composition that has a metal or metal oxide component will, to some extent or other, catalyze the oxidation of ammonia." Appx953 at ¶ 18. "Even considering only the conditions typically encountered during operation of a diesel engine," Johnson Matthey's expert, Dr. Epling, explained that, "there are an effectively limitless number of compositions that can catalyze the oxidation of ammonia." *Id.* As one example, the exhaust pipe itself would show *some* degree of AMOx catalyst function. *Id.*

Likewise, with respect to SCR catalyst function, there are a "practically limitless number of materials that would, to some extent, catalyze SCR of NOx, even within the normal operating conditions of an exhaust aftertreatment system." Appx955 at ¶ 22.

BASF does not dispute that the functional terms, if construed to require no more than an infinitesimal degree of catalyst function, would encompass an effectively limitless number of compositions. *See* Appellant's Brief at 40.

4. The Functional Terms Encompass—But Are Not Limited To—The Exemplary Compositions Disclosed in the Specification.

While there were certain exemplary AMOx and SCR catalysts, as BASF has admitted, the functional "material composition A" and "material composition B" terms are not limited to those known catalysts. Appx1162.

With respect to AMOx catalysts, it was known that precious metals such as platinum could be used. Appx1321 at ¶ 1321 (declaration of BASF's expert). The '185 patent explains that, "in one or more embodiments," an AMOx catalyst may be "a supported precious metal component," and specifically "ruthenium, rhodium, iridium, palladium, platinum, silver or gold." '185 patent, col. 8, lines 3-23. Certain dependent claims recite the use of precious metals as the AMOx catalyst. *See id.* at claims 14-16. The '185 patent, however, does not limit "material composition A" to only these exemplary materials. *E.g.* '185 patent, col. 19, lines 28-31 & col. 13, lines 54-56.

With respect to SCR catalysts, it was known that metal zeolites, vanadium, and platinum could be used, depending on the conditions. *See* Appx1320 at 25 (BASF's expert describing how these three types of compositions catalyze the SCR reaction at specific operating temperatures). The specification discloses certain non-limiting embodiments of the SCR catalyst composition, including using metal zeolites, and specifically iron or copper zeolites, as well as vanadium. *See* '185 patent, col. 6, line 47 to col. 8, line 2. Certain dependent claims recite the use of

certain metal zeolites, and particularly iron or copper zeolites, as the SCR catalyst. *See id.* at claims 10-13. The '185 patent, however, does not limit "material composition B" to only these exemplary materials. *E.g.* '185 patent, col. 19, lines 28-31 & col. 13, lines 54-56.

BASF admitted that the "material composition A" and "material composition B" terms are "not so limited" as the dependent claims that recite particular exemplary compositions. Appx1162. Moreover, the specification states that the described embodiments are non-limiting: "[a]lthough the invention herein has been described with reference to particular embodiments, it is to be understood that these embodiments are merely illustrative of the principles and applications of the present invention." '185 patent, col. 19, lines 28-31. The specification also explains that the examples presented are not intended to limit the invention "in any manner." *Id*. at col. 13, lines 54-56.

5. The Specification Evaluates Catalyst Function Using a Metric, "Conversion Percentage," That Depends Upon the Chosen Reaction Conditions.

The '185 patent specification discloses that catalyst function—whether AMOx or SCR catalyst function—exists on a continuum from 0-100%. *See, e.g.*, Figs. 8-12 (charting the SCR or AMOx catalyst functions of different compositions from 0-100%). Catalyst function can be calculated by measuring conversion percentage, which is the percentage of a compound that is chemically changed to

another compound. Appx1320 at ¶ 26 (BASF's expert, Dr. Crocker, stating that a "standard measure" of catalyst function is "conversion" or "conversion percentage."); *see also* Appx957 at ¶ 27 (Johnson Matthey's expert, Dr. Epling, describing how "scientists and engineers in this field frequently" use "percent conversion" as an objective standard of catalyst function). The higher a composition's conversion percentage, the greater catalytic function it has. Appx1320 at ¶ 26.

The '185 patent specification describes using conversion percentage to measure AMOx catalyst function and SCR catalyst function. *See, e.g.*, Appx1322 at ¶ 31 (BASF's expert stating that "the '185 patent specification identifies the measuring of catalytic performance through calculation of 'conversion' percentage"). However, the exemplary measurements in the specification are all performed under different test conditions, and the specification does not disclose under which test conditions catalyst activity should be measured to determine whether a particular composition is effective to catalyze the oxidization ammonia or the selective catalytic reduction of NOx. *See* '185 patent, col. 2, lines 24-28 (measuring AMOx catalyst function); *id.* at col. 2, lines 40-45 (measuring SCR catalyst function); *id.* at col. 2, lines 46-51 (measuring SCR catalyst function); *id.* at col. 15, lines 40-49 (measuring AMOx catalyst function); *id.* at col. 16, lines 42-45 (measuring SCR catalyst function); *id.* at col. 17, lines 59-63 (measuring AMOx

catalyst function); *id.* at col. 18, lines 16-19 (measuring SCR catalyst function); *id.* at col. 18, lines 31-37 (measuring SCR catalyst function).

A composition's conversion percentage, and thus whether it is a "material composition A" or "material composition B" as recited in the '185 patent claims, depends on the precise evaluation conditions. Most importantly, catalyst function depends heavily on temperature. *See, e.g.*, '185 patent, col. 12, lines 45-48 ("at elevated temperatures, some SCR compositions, particularly copper-based SCR catalysts, can also have appreciable ammonia oxidation activity even in the absence of a precious metal component"); *see also* Appx1319 at ¶ 23 (BASF's expert, Dr. Crocker, stating that "it was well-known to persons of ordinary skill in the art that the catalytic performance of certain catalysts would vary based on environmental considerations, such as temperature"). A particular composition often displays no catalyst function at one temperature and substantial catalyst function at another. *See, e.g.*, Appx1320 at ¶ 25 (Dr. Crocker describing how certain SCR catalysts only display SCR catalyst function at certain temperatures). There is no disclosure in the '185 patent of the proper temperature at which to test catalyst activity, and thus no way of determining whether a particular composition falls within the claims.

Other variables besides temperature also affect a composition's conversion percentage, and thus whether the composition displays any catalyst function at all. For example, the conversion percentage depends on how much of each reactant (*e.g.*,

NH_3 or NO) is initially present. *Compare* '185 patent, Fig 11 (charting catalyst function where "inlet NH3/NO=1") *with id.* at Fig. 12 (same compositions giving different catalyst functions where "inlet NH3/NO>1"). As another example, BASF's expert admitted that the particular space velocity chosen will alter the measured conversion percentage. *See* Appx1322 at ¶ 32. A higher space velocity—the flow rate of exhaust gas passing over the substrate during the measurement—means the exhaust gas spends less time in contact with the catalyst. Because the gas flow has less time over the catalyst, a "higher space velocity is associated with lower conversion percentage." *Id.* "On the other hand, a lower space velocity would be associated with a higher conversion percentage." *Id.* The '185 patent does not disclose the proper space velocity at which to test catalyst activity, and thus again the patent provides no way of determining whether a particular composition falls within the claims.

6. The Specification Discloses That the Functional Terms Require Something More Than a Conversion Percentage of 6.3%–But Never Says How Much More.

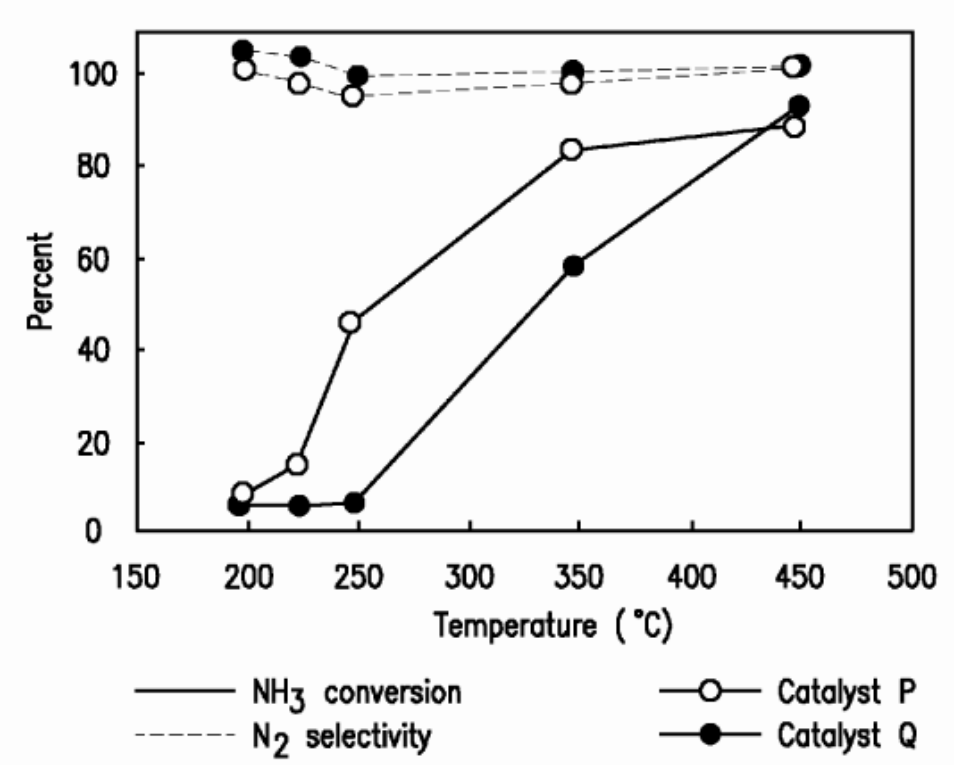
The specification of the '185 patent discloses that something more than an infinitesimal degree of AMOx or SCR catalyst function is needed for a composition to be effective for catalyzing the AMOx or SCR catalyst reaction, respectively, but the specification does not specify how much catalyst function is needed.

Example 6 in the specification best demonstrates that the functional terms require a threshold conversion percentage that is more than just trace amounts, but still unspecified. *See* '185 patent, col. 17, line 57 to col. 18, line 12. Example 6 describes testing two catalysts, "Catalyst P" and "Catalyst Q" for AMOx catalyst function. *Id.* At temperatures of 250° C and under the specified measurement conditions, Catalyst P had an AMOx conversion percentage of 46% and Catalyst Q had an AMOx conversion percentage of 6.3%. *Id.* at Table 2 (listing AMOx conversion percentages of Catalyst P and Catalyst Q as "NH_3 conv 250° C"); *see also id.* at col. 17, lines 60-63 (detailing the measurement conditions chosen for this example).

The specification states that Catalyst Q—a catalyst with a 6.3% AMOx conversion percentage—is an "SCR-only" catalyst. *Id.* at col. 18, lines 5-9. That is, the specification teaches that an AMOx conversion percentage of 6.3% is ***not enough*** for Catalyst Q to be an AMOx catalyst. *Id.* Moreover, under different temperature conditions, Catalyst Q (the "SCR-only" catalyst) displays an AMOx conversion percentage of greater than 80%. *See id.* at Fig. 10 (the AMOx conversion percentage for Catalyst Q charted as the solid line with dark circles, showing an AMOx conversion percentage of greater than 80% at the upper end of the normal operating range). Thus, not only does the specification teach that an AMOx conversion percentage of 6.3% at 250° C is insufficient to be considered an AMOx

catalyst, so too does the specification teach that an AMOx conversion percentage of greater than 80% at some temperatures is insufficient for a composition to be considered an AMOx catalyst composition. *Id*. Without defining the materials that can constitute "material composition A" or "material composition B," or defining the threshold of catalyst function required and the conditions under which such function should be measured, a person of ordinary skill would have no way to determine the boundary of the '185 patent claims.

Figure 10, which charts the results of Example 6, illustrates how ambiguously the '185 patent defines what is, or is not, an AMOx or SCR catalyst. As described above, the '185 patent calls Catalyst Q an "SCR-only" catalyst. *Id.* at col. 18, lines 5-9. The '185 patent calls Catalyst P, on the other hand, an "integrated SCR+AMOx" catalyst with the "AMOx zone placed in the downstream (outlet) position." *Id.* at col. 18, lines 1-3 & 8-9. Figure 10 charts the AMOx conversion percentages of those two catalysts: the "SCR-only" Catalyst Q and the "integrated SCR+AMOx" Catalyst P:



The solid line with black circles is the AMOx conversion percentage, or "NH_3 conversion," for Catalyst Q, which ***is not*** an AMOx catalyst according to the '185 patent. The solid line with white circles is the AMOx conversion percentage of Catalyst P, which ***is*** an AMOx catalyst according to the '185 patent. The '185 patent offers no guidance as to why Catalyst Q ***is not*** an AMOx catalyst, yet Catalyst P ***is*** an AMOx catalyst. Indeed, at certain temperatures (450 °C) the AMOx conversion percentage of the "SCR-only" Catalyst Q is ***higher*** than that of Catalyst P. *Id*. at Figure 10. Even at lower temperatures, the '185 patent does not indicate ***how much higher*** an AMOx conversion percentage Catalyst Q would have to display before it, too, would be an AMOx catalyst. No reasonably certain definition of "material composition A" exists that would include the AMOx function displayed by Catalyst

P while excluding the AMOx function displayed by Catalyst Q, and the '185 patent provides no guidance to a skilled artisan to determine the boundary of its claims.

Example 6 also demonstrates that *both* catalysts require more than an infinitesimal degree of catalyst function. Specifically, in Example 6, the '185 patent refers to the "AMOx-only part above," which in the specification is platinum or some other precious metal. *See* '185 patent, col. 18, line 1. Just as the "SCR-only" compositions in Example 6 also display *some* degree of AMOx activity, so too do the "AMOx-only" platinum and precious metal compositions display *some* degree of SCR activity. *See* Appx1320 at ¶ 25 (BASF's expert, Dr. Crocker, describing how platinum displays significant SCR activity within certain regularly encountered temperatures). Once again, however, nowhere does the disclosure of the '185 patent disclose *how much* SCR function must be present for a composition to be considered an effective SCR catalyst.

C. The Proceedings Below.

The district court held that the functional terms were indefinite under 35 U.S.C. § 112, ¶ 2 on a full record, including four rounds of briefing and a two hour *Markman* hearing. Any suggestion from BASF that the district court did not analyze the full record before it (*e.g.* Appellant's Brief at 21) is wrong.

In its opening brief to the district court, BASF never once mentioned the "longstanding, well-established principle" (*see* Appellant's Brief at 33) that it now

says requires construing the functional terms as encompassing any minimal degree of catalyst function. Appx105-114. Instead, BASF attempted to limit the functional terms by using the undefined standard of how they would be "understood in the art of exhaust systems," without ever saying what standards or methods that person would use. Appx105-114. Moreover, although BASF submitted an expert declaration in support of its opening brief about other issues, its expert, Dr. Crocker, offered no opinion whatsoever on the "material composition A" and "material composition B" functional terms. *See* Appx313-320.

Johnson Matthey's response brief pointed out that BASF had failed to argue any boundary to the functional terms whatsoever, as *Nautilus* requires, *see* Appx379-393, and submitted an expert declaration to support its position that the functional terms are indefinite, *see* Appx950. Johnson Matthey also argued in the alternative that, if the district court held that the functional terms were definite, they should be construed broadly and not limited—as BASF's opening brief tried to do—by the undefined standard of how they would be "understood in the art of exhaust systems." Appx392-393.[2]

[2] In its opening brief, BASF criticized Johnson Matthey's alternative construction that, if the claims were held to be definite, they should be construed broadly. BASF argued that Johnson Matthey's alternative construction was "a plain attempt by JMI to seek overly broad constructions …." *See* Appx107-108.

Thereafter, BASF shifted position, arguing for the first time in reply that the functional terms encompassed any minimal degree of function under any conditions. *See* Appx1161-1170. In its sur-reply, Johnson Matthey responded to BASF's new argument, pointing out that BASF's new position conflicted with the '185 patent specification and with the statements of its own expert, *see* Appx1392-1402, Appx1408-1411.

On January 22, 2016, the district court held a *Markman* hearing. *See* Appx1412. At the end of the hearing, after hearing argument on the "material composition A" and "material composition B" functional terms, the district court specifically asked counsel for BASF if he could articulate any reasonable boundary to the functional terms. Appx1498. BASF's counsel did not articulate any reasonable boundary for these functional terms, but rather confirmed BASF's view that there are no limits to the scope of these terms:

> **THE COURT**: Well, I certainly understand that there are essentially no limits to what plaintiff argues except that if the, except that the combination be effective in any, in any way.
> **[BASF COUNSEL]**: In the context of exhaust systems to achieve SCR or AMOx, yes.
> **THE COURT**: All right.

Appx1498.

To more speedily and efficiently resolve patent suits, the district court has adopted a policy of trying to issue its *Markman* opinions within 30 days of the *Markman* hearing. *See, e.g.,* Findings of the Patent Study Group (PSG) at 16-17,

U.S. District Court for the District of Delaware (May 13, 2014).[3] The district court followed that policy here, giving itself a month to issue a decision on claim construction. *See* Scheduling Order at ¶ 5(g)-(h), *BASF Corporation v. Johnson Matthey, Inc.*, No. 14-1204 (D. Del. Dec. 8, 2014) (ECF No. 12) (setting *Markman* hearing for January 22, 2016 and requiring court to issue decision on claim construction by February 23, 2016); *see also* Appx1499 (the district court stating at the *Markman* hearing: "I'm sure we have a schedule. We'll try our best to meet it."). BASF agreed to this schedule. *Id.*

On February 9, 2016, the district court issued its claim construction order, construing not only the "material composition A" and "material composition B" functional terms, but also two other categories of claim terms not at issue here. Appx1-6. BASF's attempt to use the length of the opinion (the work of a district judge with more than two decades' experience with patent cases) to argue that the district court did not fully consider the evidence presented or BASF's arguments (*e.g.*, Appellant's Brief at 4, 21) is unfortunate. There is no reason to assume the district court did not consider the full record before it, including 86 pages of briefing, over 1,000 pages of exhibits, 4 expert declarations, and the lengthy oral argument. Nowhere in this record did BASF identify a reasonably certain boundary for the

[3] *Available at* http://www.ded.uscourts.gov/sites/default/files/news/2014/May/15/PSG-FBA-CLE-5-13-2014.pdf.

"material composition A" and "material composition B" functional terms; it did not require a lengthy opinion to state that fact.

Because either the "material composition A" or "material composition B" term is present in each of the '185 patent's claims, the district court's finding that these terms are indefinite rendered each of patent claims invalid as indefinite. On February 29, 2016, the district court entered final judgment of invalidity. Appx7.

SUMMARY OF ARGUMENT

The district court correctly invalidated the claims as indefinite under 35 U.S.C.§ 112, ¶ 2. Claims must be read in light of the specification. That is particularly true here, where the claims use functional terms to identify the composition of two catalysts—an SCR catalyst and an AMOx catalyst. The specification evaluates both SCR function and AMOx function using a standard, called "conversion percentage," whose value varies from 0-100% and depends upon the chosen reaction conditions. Importantly, the specification also discloses that a composition must display *something more than an infinitesimal degree* of SCR or AMOx function to be considered an SCR or AMOx catalyst, respectively. *See, e.g.*, '185 patent at Table 2 & col. 18, lines 5-9 (describing Catalyst Q as an "SCR-only" catalyst, despite it having an AMOx conversion percentage of 6.3% at 250 °C and above 80% at the upper end of the normal operating range). The intrinsic evidence teaches that a conversion percentage of 6.3% is always insufficient, and that even a

conversion percentage of above 80% is insufficient at some temperatures, but never reasonably conveys *how much more catalyst function* a composition must display to fall within the scope of the functional terms.

BASF nonetheless argues—without once mentioning the contradictory disclosures in the specification—that the functional limitations encompass even an infinitesimal degree of catalyst function, a construction that would absurdly encompass a practically limitless number of compositions, including the exhaust pipe. To support its position, BASF makes overly broad legal arguments, divorced from the context of both the '185 patent and the cases it cites. None of BASF's cases use functional language to define a *critical* claim limitation, like the identity (or how to learn the identity) of a catalyst composition, where the intrinsic evidence specifically discloses that *something more than an infinitesimal degree* of function is required, but never specifies with reasonably certainty how much function is required (or how to measure it).

Finally, even accepting BASF's argument that the functional terms encompass any minimal degree of function, these limitations are still indefinite because there is no disclosure of which test a skilled artisan should use to determine if a particular composition exhibits the claimed functions. It is undisputed that the degree of function displayed by a particular composition varies depending on the temperature and on the chosen measurement conditions. Yet the '185 patent

discloses at least five outcome-determinative methods to measure SCR function and at least three outcome-determinative methods to measure AMOx function, while never indicating which to use. A composition that displays activity under one of the disclosed measurement methods may display no activity whatsoever under another. BASF does not even argue that the '185 patent reasonably conveys which of the disclosed methods to use or that a person of ordinary skill would otherwise know which to use. For that additional reason, the '185 patent claims are indefinite.

STANDARD OF REVIEW

Indefiniteness is a question of law that this Court reviews de novo, *see Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1341 (Fed. Cir. 2015), with underlying factual determinations made by the district court based on extrinsic evidence reviewed for clear error, *see Biosig Instruments, Inc. v. Nautilus, Inc*., 783 F.3d 1374, 1377-78 (Fed. Cir. 2015).

ARGUMENT

The '185 patent claims two catalyst compositions using functional terms. Rather than unambiguously claiming what the catalyst compositions ***are***, the '185 patent claims what the catalyst compositions ***do***—*i.e.*, the claims cover any and all compositions that are effective for catalyzing a particular reaction. The claims are indefinite for two independent reasons. First, the '185 patent fails to reasonably define a boundary to the functional terms. The intrinsic evidence discloses only that

a 6.3% conversion percentage is *not enough catalyst function* for a composition to be considered effective for catalyzing a particular reaction, without ever conveying to a skilled artisan which of the effectively limitless number of compositions that display some degree of catalyst function fall within the scope of the claims. Second, even if the boundary were reasonably certain, the '185 patent fails to reasonably inform a skilled artisan how to ascertain whether a composition falls within it. Instead, as BASF does not dispute, the '185 patent discloses numerous outcome-determinative methods to measure both AMOx and SCR function and never specifies which method to use.

Accordingly, the "material composition A" and "material composition B" terms in claim 1, the "material composition" term in claim 5, and the "material composition B" term in claim 17 are indefinite.

A. The '185 Patent Claims, Read in Light of the Specification, Fail to Define the Boundaries of the Functional Terms.

A skilled artisan would not be able to discern the boundaries of the "material composition A" and "material composition B" functional terms when examining them in light of the claims, the patent specification, and the prosecution history.

"[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc*., 134 S. Ct. 2120, 2124 (2014). A claim

term must have a "reasonably clear and exclusive … objective boundary." *Interval Licensing LLC v. AOL, Inc*., 766 F.3d 1364, 1373 (Fed. Cir. 2014); *see also Halliburton Energy Services, Inc. v. M-I LLC*, 514 F.3d 1244, 1253 (Fed. Cir. 2008) ("While patentees are allowed to claim their inventions broadly, they must do so in a way that distinctly identifies the boundaries of their claims."). A patent is a property right, "and like any property right, its boundaries should be clear." *Nautilus,* 134 S. Ct. at 2124; *see also Markman v. Westview Instruments, Inc*., 517 U.S. 370, 373 (1996) ("It has long been understood that a patent must describe the exact scope of an invention ….").

The functional terms here, however, have no reasonably defined boundary. The only possible boundary BASF has identified—that even an infinitesimal degree of catalyst function is sufficient, which would read on an effectively limitless number of compositions, *see* Appx953 at ¶ 18; Appx955 at ¶ 22—is contradicted by the disclosure of the '185 patent. Because the objective boundary of these limitations cannot be determined with reasonable certainty, the terms are indefinite. *Nautilus*, 134 S. Ct. at 2124.

1. The Specification Discloses That the Functional Terms Require More Than an Infinitesimal Degree Catalyst Function—But Never Says How Much More.

Claims "must be read in view of the specification, of which they are a part." *Phillips v. AWH Corp*., 415 F.3d 1303, 1315 (Fed. Cir. 2005). The specification "is

always highly relevant to the claim construction analysis" and "[u]sually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Id.* The specification is particularly important when interpreting functional claim terms. "When a claim limitation is defined in purely functional terms, the task of determining whether that limitation is sufficiently definite is a difficult one that is highly dependent on context (e.g., the disclosure in the specification and the knowledge of a person of ordinary skill in the relevant art area)." *Halliburton*, 514 F.3d at 1255.

The specification of the '185 patent discloses that something more than an infinitesimal degree of AMOx or SCR catalyst function is needed for a composition to be effective for catalyzing the AMOx or SCR catalyst reaction. The specification, however, never says how much more. As described above, *see supra* pp. 14-18, Example 6 of the specification describes a composition that displays an AMOx conversion percentage of 6.3% as an *"SCR-only catalyst."* '185 patent at Table 2 & col. 18, lines 5-9. In fact, that same "SCR-only catalyst" displays an AMOx conversion percentage of greater than 80% at temperatures at 450° C, *see id*. at Fig. 10, a temperature within the normal operating range. *See* Appx1320 at ¶ 25 (BASF's expert stating that 400-500° C is the upper end of the usual operating range). The AMOx conversion percentage of the "SCR-only" catalyst is actually *higher than* the conversion percentage of what the specification describes as a "SCR+AMOx

catalyst." '185 patent at Table 2 & col. 18, lines 5-9. Thus, the "SCR-only" catalyst actually displays some degree of AMOx catalyst at 250° C and even outperforms the AMOx catalyst at 450° C.

Likewise, the specification describes compositions that frequently display substantial SCR activity as *"AMOx-only parts." See supra* p. 18. Specifically, platinum compositions, which the '185 patent calls "AMOx-only parts," *see id.* at col. 18, line 1, were known used as SCR catalysts under some conditions. *See* Appx1320 at ¶ 25 (BASF's expert stating that "it was known that platinum SCR catalysts performed catalysis at an operating temperature of 175-250 degrees Celsius").

The intrinsic evidence, therefore, directly contradicts BASF's argument that the functional terms encompass any infinitesimal degree of function. Without defining the materials that can constitute "material composition A" or "material composition B," or defining the threshold of catalyst function required, a person of ordinary skill would have no way to determine the boundary of the '185 patent claims. *See Honeywell Int'l, Inc. v. Int'l Trade Comm'n*, 341 F.3d 1332, 1341 (Fed. Cir. 2003) (patent indefinite if it fails to provide some objective boundary which "put[s] the public on fair notice of what compositions fall within the scope of the claims").

BASF's Appellant's Brief never once mentions this intrinsic evidence, despite it directly contradicting BASF's position that a person of ordinary skill would read functional terms as encompassing any minimal degree of catalyst function. Where BASF does address the specification, it draws unsupported and incorrect conclusions about the disclosure. First, BASF has an entire section entitled "The particular arrangement of the washcoat layers improves performance *regardless of which catalysts are used*." *See* Appellant's Brief at 14-15 (emphasis added). None of the cited portions of the specification actually support that assertion. BASF cites only to the performance of one AMOx catalyst (platinum) and two SCR catalysts (CuCHA and FeBEA) shown in Table 1. *See* Appellant's Brief at 14-15. BASF provides no evidence that the performance seen by those *three catalyst compositions* could be extended to *any* composition whatsoever, even those that display only an infinitesimal degree of AMOx or SCR catalyst function. BASF has never disputed that, under such a broad construction, the terms could cover "[m]ost any material composition that has a metal or metal oxide component," including the exhaust pipe. Appx953 at ¶ 18; *see also* Appx955 at ¶ 22 ("practically limitless number of materials that would, to some extent, catalyze SCR of NOx, even within the normal operating conditions of an exhaust aftertreatment system.").

Second, BASF makes the argument that the functional terms are definite, because they "encompass well-known materials" disclosed by the specification.

Appellant's Brief at 41-47. But the problem is that the specification gives only examples of materials that might work, while the claim language could possibly include other materials that aren't mentioned in the specification. In particular, the specification always uses non-limiting language when identified exemplary SCR catalysts, saying "[i]n accordance with one or more embodiments of the invention" or "[i]n some embodiments." *Id.* at col. 6, lines 47-67. The specification uses similar non-limiting language when describing exemplary AMOx catalysts. *See id.* at col. 8, lines 4-56. The specification states that all embodiments are non-limiting: "[a]lthough the invention herein has been described with reference to particular embodiments, it is to be understood that these embodiments are merely illustrative of the principles and applications of the present invention." '185 patent, col, 19, lines 28-31. The disclosed embodiments, therefore, do not reasonably convey the boundary of the challenged functional terms. *See Interval Licensing*, 76 F.3d at 1371 ("The claims, when read in light of the specification and the prosecution history, must provide objective boundaries for those of skill in the art.").

Indeed, BASF itself has admitted that the disputed claim terms are not limited to the particular examples mentioned in the specification. *See* Appx1162. And it had to do this, because the dependent claims also recite the same list of materials in the specification, showing that the broad terms "material composition A" and "material composition B" in the independent claims must be broader than just those

materials. *Compare* '185 patent, claim 10 *with id.* at col. 6, lines 56-67; *compare also id.* at claim 14 *with id.* at col. 8, lines 11-23. So the examples in the specification simply do not inform the skilled artisan about the boundaries of the terms "material composition A" and "material composition B," because they are broader than the examples in the specification, yet the patent gives no threshold for determining what else they cover.

Third, BASF also incorrectly argues that the '185 patent's specification "expressly defines the catalyzing functions that the claimed 'material compositions' must perform." Appellant's Brief at 15. The specification does not define, expressly or otherwise, a material composition A effective for catalyzing NH_3 oxidation or a material composition B effective to catalyze selective catalytic reduction of NOx. What the specification does define are merely the SCR and AMOx reactions, which were well-known chemical processes. *See* '185 patent, col. 5, lines 33-35 & 40-44. The functional terms recite a material composition ***effective to catalyze*** the SCR reaction or the AMOx reaction. The chemical reactions do not assist a skilled artisan in determining ***which materials*** are encompassed within the "material composition A" and "material composition B" terms. The functional terms are not ambiguous because it is uncertain what reactions must be catalyzed; they are ambiguous because it is uncertain what it means to be effective to catalyze those reactions.

Accordingly, the intrinsic evidence directly contradicts BASF's position that the functional terms encompass any infinitesimal degree of catalyst function.

2. The Extrinsic Evidence Corroborates That a Person of Ordinary Skill Would Read the Functional Terms as Requiring More Than a Minimal Degree of Catalyst Function.

An inventor of the '185 patent, BASF's expert, and Johnson Matthey's expert all agree that the '185 patent does not encompass any minimal degree of catalyst function, which contradicts BASF's position and demonstrates how the '185 patent fails to reasonably convey the scope of the functional terms. *See Nautilus,* 134 S. Ct. at 2129 ("A patent's claims, viewed in light of the specification and prosecution history, [must] inform *those skilled in the art* about the scope of the invention with reasonable certainty.") (emphasis added); *see also id.* ("One must bear in mind, moreover, that patents are not addressed to lawyers, or even to the public generally, but rather to those skilled in the relevant art.") (internal quotation omitted).

First, Dr. Buzby, an inventor of the '185 patent, testified that his invention did not include AMOx and SCR catalysts that display any minimal level of AMOx or SCR function, respectively. Dr. Buzby agreed that copper chabazite, a common SCR catalyst, also under certain conditions exhibits *some* AMOx catalyst function. *See* Appx851 at 196:4-197-8; *see also* '185 patent, col. 12, lines 45-48 ("at elevated temperatures, … copper-based SCR catalysts … also have appreciable ammonia oxidation activity"). Nonetheless, Dr. Buzby denied that his invention included

using copper chabazite as the AMOx catalyst. Appx853 at 203:3-17 (testifying that copper chabazite is "just an SCR catalyst"). Similarly, Dr. Buzby agreed that platinum, a common AMOx catalyst, displays *some* SCR catalyst function under *some* conditions, *see* Appx851 at 194:23-195:1, yet testified that the invention of the '185 patent does not include the use of platinum as the SCR catalyst. Appx853 at 203:18-204:4. Dr. Buzby, therefore, did not understand his own patent as teaching that an AMOx or SCR catalyst includes any composition that shows any degree of AMOx or SCR catalyst function, respectively.

Second, Johnson Matthey's expert, Dr. Epling, opined that: "In my experience, scientists and engineers in this field do not consider materials that display only a minimal level of SCR or ammonia oxidation function to be a material effective to reduce NOx or to oxidize ammonia." Appx1410 at ¶ 10. Therefore, it was his opinion "that a person of ordinary skill in this art would not interpret these limitations to include any material that possessed any degree of effectiveness to oxidize ammonia or catalyze the selective catalytic reduction of NOx." *Id.* As he explained, "[s]uch a definition would encompass virtually any material, including materials that a person of ordinary skill would not consider to be an ammonia slip catalyst (in the case of 'material composition A') or an SCR catalyst (in the case of 'material composition B')." *Id.* Such a broad construction would even read on compositions like the exhaust pipe. Appx953 at ¶ 18. Dr. Epling explained how the

'185 patent's disclosure of Catalyst Q as an "SCR-only" catalyst, *see supra* pp. 14-18, supported his opinion that "a person of ordinary skill would not interpret these [functional terms] to include any material that possessed any degree of effectiveness." Appx1410 at ¶ 11.

Third, BASF's own expert, Dr. Crocker, also contradicted BASF's position that the claims encompass any minimal degree of catalyst function. In discussing Catalyst Q in the specification, he states that it is referred to as an "SCR-only" catalyst, because a "catalyst that only works above 300 degrees C *would not be optimal* for mobile applications at 250 degrees Celsius." Appx1324-1325 at ¶ 35 (emphasis added). Dr. Crocker never explained what it means for a catalyst to be "optimal" for mobile applications, or how to determine whether a catalyst is "optimal" for mobile applications. *Id*.

BASF ignores all this contradictory evidence, focusing instead on the extrinsic evidence that the claims encompassed certain well-known catalyst materials. *See* Appellant's Brief at 47-56. As with the disclosure of certain exemplary compositions in the specification, however, the claims are not limited to the catalyst materials mentioned in the extrinsic evidence. An inventor confirmed this, stating in his deposition that, "[t]here are other types of materials, not described in the supporting claims, which catalyze SCR [and] I cannot render a judgment as to whether those fall within claim 1." Appx804 at 114:5-16, 115:15-22, 116:1-23.

BASF's expert likewise testified that some materials effective for catalyzing AMOx were set forth in dependent claims 14-16, but that there are other materials not listed in claims 14-16 that may oxidize ammonia—*i.e.,* that may constitute a "material composition A." Appx802 at 108:11-109:13.

Claims must have a reasonably certain boundary to be definite. *See Nautilus*, 134 S. Ct. at 2124; *see also Interval Licensing*, 766 F.3d at 1371. Extrinsic evidence showing that *certain* materials may fall at the center of the functional "material composition A" and "material composition B" terms does not provide any objective boundary for these terms, because it does not tell a skilled artisan all the other materials that may or may not fall within the claims, and even BASF's inventor did not know what they were either.

3. BASF's Legal Argument About the Scope of Functional Terms Ignores the Context of the '185 Patent and of the Cases It Cites.

BASF argues that, because of a general legal principle, the functional terms encompass any infinitesimal degree of catalyst function, *see* Appellant's Brief at 33, a construction that BASF does not dispute would encompass even compositions like the exhaust pipe, *see* Appx953 at ¶ 18. Specifically, BASF asserts that there "is a longstanding, well-established principle that functional limitations need not recite a minimum amount of function." Appellant's Brief at 33.

BASF's argument, however, is wrong and contrary to the '185 patent specification. BASF ignores that none of the cases it cites use functional language

the same way that the '185 patent does—*i.e.*, none of BASF's cases use functional language to define a *critical* claim limitation, like the identity (or how to learn the identity) of a catalyst composition, where the intrinsic evidence specifically discloses that *some meaningful amount* of function is required, but never specifies with reasonably certainty how much function is required (or how to measure it).

In the first class of cases BASF cites to support its erroneous proposition, the claims use functional language to define some "uncritical" limitation, such as an amount, time, or temperature. *See In re Caldwell*, 319 F.2d 254, 258 (CCPA 1963); *Abbott Labs. v. Baxter Pharm. Prods,. Inc*., 334 F.3d 1274 (Fed. Cir. 2003); *Geneva Pharms., Inc. v. GlaxoSmithKline PLC*, 349 F.3d 1373 (Fed. Cir. 2003). For example, in *Caldwell* the claims recite "an effective amount of aspirin for growth stimulation." 319 F.2d at 255. The claims unambiguously defined the particular molecule or composition, aspirin, using non-functional language. *See id.* ("Acetylsalicylic acid is, of course, aspirin."). For an "uncritical" limitation like amount, however, the Court noted that functional definitions were "not only common but … expressly approved." *Id.* at 258. The Court also stated that time or temperature could be other "uncritical" limitations. *Id.*

The other cited cases in this first class likewise use functional language to define an "uncritical" amount of a non-functionally defined molecule or composition. In *Abbott Labs.*, the claims recite an "effective amount" of a Lewis

acid inhibitor "selected from the group consisting of water, butylated hydroxytoluene, methylparaben, propylparaben, propofol, and thymol." 334 F.3d at 1276. Likewise, in *Geneva Pharms.* the claims used functional language to recite "a synergistically effective amount *of clavulanic acid* and an antibacterially effective amount *of amoxicillin*." 349 F.3d at 1375-76. Accordingly, where the claim recites a precisely defined molecule or composition, *e.g.,* aspirin, specific Lewis acid inhibitors, or clavulanic acid, it is well-accepted to use functional language to define an "uncritical" limitation like amount, time, or temperature. *See Caldwell*, 319 F.2d at 258. Johnson Matthey does not now challenge, and never has challenged, the common practice of claiming an "effective amount" or a "pharmaceutically acceptable amount" of a non-functionally claimed composition or molecule.

The challenged functional limitations in the '185 patent, however, are not used to identify an uncritical claim limitation like amount. This is illustrated by the "material composition A" term in claim 17, whose validity is not at issue here. Claim 17, rather than defining the identity of the catalyst solely by function, recites substances readily identified in the periodic table—a "material composition A ***comprising a precious metal*** effective for catalyzing NH_3 oxidation." '185 patent, col. 20, lines 50-51 (emphasis added). On the other hand, the challenged functional terms define the composition *only by* a particular catalyst function it must display, which emphasizes the criticality of that functional limitation—it is the only way a

person of ordinary skill can reasonably determine whether or not the claims cover a potentially limitless number of compositions. Thus, rather than being an "uncritical" limitation, the functional terms here are the only basis for determining which of the potentially limitless number of compositions are covered by the claims.

In the second class of cases BASF cites, courts interpreted claim terms as encompassing any minimal degree of function only where the intrinsic evidence supported such an interpretation. *See In re Swinehart*, 439 F.2d 210 (CCPA 1971); *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293 (Fed. Cir. 2005); *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367 (Fed. Cir. 2014). BASF repeatedly cites *Swinehart* to argue that the term "effective" has "consistently" been interpreted as requiring no minimum level of function. *See, e.g.*, Appellant's Brief at 34. The Court in *Swinehart*, however, did not establish a such a consistent or general rule. Instead, the Court looked to the specific disclosure of that patent to see whether it made the functional language "sufficiently clear." 439 F.2d at 214. Importantly, the Court did "not read [patentee's] disclosure as suggesting that only certain *degrees* of transparency to infrared are comprehended within the teaching there given." *Id.* For that reason—and not because of some general rule about claim

language—the Court adopted a broad construction of the functional term that encompassed any minimal degree of function.[4] *Id.*

BASF cites additional cases where the specification consistently described the functional terms as broadly encompassing any degree of function or where there was no argument that the specification would be inconsistent with such a broad construction. In *Cross Med. Prods.*, the Court once again looked to the intrinsic record and found that it "consistently describes" a broad interpretation of the functional language. 424 F.3d at 1306. Similarly, in *Hill-Rom Servs.*, there was "an unequivocal disclosure, in the patent itself," that the functional term should be construed broadly. 755 F.3d at 1375. Finally, in *Leggett & Platt, Inc. v. VUTEk, Inc*., 537 F.3d 1349, 1356 (Fed. Cir. 2008), there was no argument that the broad, any-degree-of-function interpretation would be indefinite.

The disclosure of the '185 patent directly contradicts a broad construction of the functional terms that would encompass any infinitesimal degree of function. Accordingly, BASF's argument ignores the specific context of the '185 patent—

[4] The claim at issue in *Swinehart* recited "a solidified melt of two components" that was "transparent to infra-red rays and resistant to thermal shock." *See id.* at 211. The clams in *Swinehart* did not encompass *any* two components that displayed the recited function, but instead unambiguously limited the claims to two identified components using non-functional language. *See id*. ("one of said components being BaF(2) and the other being CaF(2)"). The functional terms at issue here, on the other hand, encompass *any* composition that exhibits the (undefined) function.

where the claims use functional language to recite a critical limitation, and the specification requires a threshold, but unspecified, degree of function.[5] By contradicting the teaching of the specification, BASF's argument also violates one of the central tenants of claim construction. *See, e.g., SciMed Life Sys., Inc. v.*

[5] In a footnote, BASF includes a lengthy string cite to still more cases that supposedly use "effective" in the same way as the claims of the '185 patent. *See* Appellant's Brief at 31-32 n.1. A full reading of those cases, however, shows that none of them use functional language the same way that the '185 patent does, either because the case only uses functional language to identify an uncritical amount of an otherwise unambiguously defined molecule or component, or because the intrinsic evidence was apparently consistent with a broad, any-degree-of-function interpretation. *See Perricone v. Medicis Pharm. Corp*., 432 F.3d 1368, 1373 (Fed. Cir. 2005) (functional language recites an uncritical amount of an unambiguously identified molecule); *Eaton Corp. v. Rockwell Int'l Corp*., 323 F.3d 1332, 1343 n.1 (Fed. Cir. 2003) (functional terms "written in means-plus-function format and are to be interpreted according to 35 U.S.C. § 112, 6 as being limited to the corresponding structure identified in the specification for performing the claimed function,"); *In re Smith*, 458 F.2d 1389, 1390-91 (CCPA 1972) (functional language recites an uncritical amount of an unambiguously identified molecule); *In re Hoeksema*, 332 F.2d 374, 376 (CCPA 1964) (functional language recites an uncritical amount of an unambiguously identified component); *In re Tanke*, 213 F.2d 551, 553 (CCPA 1954) (no argument that the broad, any-degree-of-function interpretation of the functional language would be inconsistent with the intrinsic evidence or otherwise indefinite); *In re Prutton*, 200 F.2d 706, 708 (CCPA 1952) (functional language recites an uncritical amount of an unambiguously identified component); *In re Peterson*, 136 F.2d 755, 755 (CCPA 1943) (no argument that the broad, any-degree-of-function interpretation of the functional language would be inconsistent with the intrinsic evidence or otherwise indefinite); *Saler v. Hallock*, 109 F.2d 254, 255 (CCPA 1940) (no argument that the broad, any-degree-of-function interpretation of the functional language would be inconsistent with the intrinsic evidence or otherwise indefinite); *Union Switch & Signal Co. v. Louisville Frog, Switch & Signal Co*., 73 F.2d 550, 551 (6th Cir. 1934) (no argument that the broad, any-degree-of-function interpretation of the functional language would be inconsistent with the intrinsic evidence or otherwise indefinite).

Advanced Cardiovascular Sys., Inc., 242 F.3d 1337, 1343 (Fed. Cir. 2001) ("[T]he characterization of the coaxial configuration as part of the 'present invention' is strong evidence that the claims should not be read to encompass the opposite structure."); *Andersen Corp. v. Fiber Composites, LLC*, 474 F.3d 1361, 1367 (Fed. Cir. 2007) (specification's description of a "critical element" found limiting); *NTP, Inc. v. Research In Motion, Ltd.*, 418 F.3d 1282, 1297 (Fed. Cir. 2005) ("[B]ecause RIM's [claim construction] argument … contradicts the text and figures of the written description, it must be rejected.")).

BASF's argument is not supported by two recent cases from this Court addressing the post-*Nautilus* indefiniteness standard. In *Cox Commc'ns, Inc. v. Sprint Commc'n Co.*, 838 F.3d 1224 (Fed. Cir. 2016), the functional terms were not critical to defining the scope of the claims. Instead, "the sole source of indefiniteness that [the patent challenger] complains of, 'processing system,' *plays no discernable role in defining the scope of the claims*." *Id.* at 1229 (emphasis added.); *see also id.* at 1231 ("If 'processing system' does not discernably alter the scope of the claims, it is difficult to see how this term would prevent the claims … from serving their notice function under § 112, ¶ 2."). In *Sonix Tech. Co., Ltd. v. Publ'ns Int'l, Ltd.*, --- F.3d ---, No. 2016-1449, 2017 WL 56321, at *6 (Fed. Cir. Jan. 5, 2017), the claim term itself ("visually negligible") provided an "objective baseline through which to interpret the claims." Moreover, the specification, rather than disclosing only that

some unspecified threshold degree of function was required, disclosed "requirements for the graphical indicators being negligible to human eyes." *Id.* at *7. Thus, neither case supports BASF's position that the functional terms of the '185 patent are definite.

4. BASF Chose to Draft its Claims Ambiguously.

The ambiguity of the "material composition A" and "material composition B" functional terms is a problem of BASF's own making. *See Halliburton*, 514 F.3d at 1255 ("We note that the patent drafter is in the best position to resolve the ambiguity in the patent claims…."). There was no "practical necessity" that forced BASF to use functional language. *Cf. Swinehart*, 439 F.2d at 212. BASF did not use functional language because of the "limitations inherent in language." *Cf.* Appellant's Brief at 29. BASF could have claimed what the catalyst compositions are, rather than claiming only what they do. In fact, BASF drafted dependent claims doing exactly that. *See*, *e.g.*, '185 patent, claim 14 (defining "material composition A" unambiguously as "a precious metal component dispersed on support particles"); *see also id.* at claim 10 (defining "material composition B" unambiguously as "… metal from one of the groups VB, VIIB, VIIB, VIIIB, IB, or IIB of the periodic table distributed on or within the molecular sieve …"). Rather than as a "practical necessity," BASF's use of functional language came under an express corporate

policy to "[s]crutinize new BASF patent applications to cover broader scope than envisioned by inventors." Appx813.

Having drafted ambiguous functional claims, BASF now asks that this Court resolve the ambiguity in a way that gives the claims the broadest possible construction, a construction so broad that BASF does not even dispute it would read onto a virtually limitless number of compositions. *See* Appx953 at ¶ 18; Appx955 at ¶ 22; *see also* Appellant's Brief at 40 (not disputing breadth of the construction it seeks). In *Halliburton*, the Court rejected a similar attempt by the patentee to resolve the ambiguity in functional claim language "in a way that gives it the broadest possible construction." 514 F.3d at 1253-54. The Court found that "such a construction would undermine the notice function of the claims because it would allow [the patentee] to benefit from the ambiguity, rather than requiring [the patentee] to give proper notice of the scope of the claims to competitors." *Id.* at 1254. "Additionally, adopting the broadest possible construction could retard innovation because cautious competitors may steer too far around that which [the patentee] actually invented." *Id.*

Here, BASF has drafted functional terms with no clear boundaries, where the specification directly contradicts the boundary BASF now proposes. Faced with this ambiguity, BASF seeks claim constructions that could read on practically any composition. *See* Appx953-955 at ¶ 18, 22. Johnson Matthey does not argue that

the claims are indefinite because they are broad. *Cf.* Appellant's Brief at 40. The claims are indefinite because they are ambiguous and, as in *Halliburton*, BASF's broadest possible, effectively limitless claim constructions "would undermine the notice function of the claims" by allowing BASF "to benefit from the ambiguity," 514 F.3d at 1253-54, while contradicting the specification's statements showing that the terms are not so limitless.

5. BASF Did Not Identify Any Disputed Material Facts to the District Court and Still Does Not Here.

In the district court proceedings, BASF did not identify any unresolved factual issues that would have precluded a ruling on indefiniteness. *See* Appx105-114 (relevant portion of BASF's opening brief to the district court); Appx1161-1171 (relevant portions of BASF's reply brief to the district court). BASF still has not identified a specific unresolved and material factual issue. *See* Appellant's Brief 57-58. Accordingly, because there is an absence of a genuine issue of material fact, affirming the district court's judgment of invalidity is appropriate. *See, e.g., Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565, 1571 (Fed. Cir. 1991) ("When a sufficiently supported motion has been submitted, the burden of coming forward and showing that there is a genuine issue of material fact shifts to the nonmovant.").

B. The '185 Patent Discloses Numerous Ways to Measure Catalyst Function, Each Giving Different and Potentially Outcome-Determinative Results.

The "material composition A" and "material composition B" limitations are also indefinite for a separate reason: the '185 patent fails to reasonably inform a person of ordinary skill how to measure the claimed catalyst functions to determine whether particular compositions fall within the scope of the claims. Even if a person of ordinary skill knew what degree of function the claims encompassed (*e.g.*, BASF's position that the claims encompass any infinitesimal degree of function), the '185 patent discloses numerous outcome-determinative methods to measure catalyst function and never specifies which method to use.

When a patent recites a particular variable, such as the required degree of catalyst function, it must reasonably convey to a person of ordinary skill how to ascertain that variable. For example, in *Teva Pharms. USA, Inc. v. Sandoz, Inc*., the claims recited a variable—"molecular weight"—that could be measured in three different ways that typically gave different values. 789 F.3d 1335, 1338 (Fed. Cir. 2015). Because the claims, specification, and prosecution history did not provide reasonable certainty about how "molecular weight should be measured," the Court held that "the patentee has failed to inform with reasonable certainty those skilled in the art about the scope of the invention." *Id.* at 1345; *see also Honeywell,* 341 F.3d at 1341 (claims indefinite there were multiple sample preparation methods known

in the art, the specification did "not compel a narrowing of the claim language to any one of the possible definitions," and "the testing results will necessarily fall within or outside the claim scope depending on the sample preparation method chosen").

Here, the '185 patent discloses at least five exemplary outcome-determinative methods to measure SCR function and at least three exemplary outcome-determinative methods to measure AMOx function. No matter what degree of function the functional terms require, whether a particular composition falls within the scope of the claims depends on which of the disclosed methods of measurement is used. Because the '185 patent offers no guidance on which method to use, a person of ordinary skill would be unable to determine whether a particular composition falls within the scope of the functional terms—no matter what boundary is chosen, whether it any infinitesimal degree or some higher degree. The claims are therefore indefinite. *See Dow Chem. Co. v. Nova Chemicals Corp. (Canada)*, 803 F.3d 620, 634 (Fed. Cir. 2015) (claims indefinite where there were four possible methods to measure a claimed variable, "the methods do not always produce the same results," "the method chosen … could affect whether or not a given product infringes the claims," and none of the claims, the specification, or the prosecution "provides any guidance as to which method should be used").

1. The '185 Patent Discloses Multiple Outcome-Determinative Methods to Measure Catalyst Function and Offers No Guidance on Which to Use.

The '185 patent uses a standard called conversion percentage to measure catalyst function. *See* Appx1322 at ¶ 31 (BASF's expert stating that "the '185 patent specification identifies the measuring of catalytic performance through calculation of 'conversion' percentage."); *see also, e.g.*, '185 patent, col. 2, lines 24-28 & lines 40-45. As both experts agree, what conversion percentage a particular compositions exhibits depends on the precise evaluation conditions. Appx1322 at ¶ 31-32; Appx954 at ¶ 19; Appx956 at ¶ 23. For example, BASF's expert described how it was "well-known to persons of ordinary skill in the art that the catalytic performance of certain catalysts would vary based on environmental considerations, such as temperature." Appx1319 at ¶ 23. It is undisputed that a given composition could exhibit no catalyst function at one temperature and some degree of catalyst function at another. *See* Appx1320 at ¶ 25 (BASF's expert describing active temperature ranges of certain catalyst compositions); *see also* Appx956-957 at ¶ 23-26 (Johnson Matthey's expert stating that chosen reaction conditions determine whether composition will exhibit catalyst function).

BASF's expert described how the conversion percentage also depended on other conditions besides temperatures, such as the "gas hourly space velocity," which relates to how much exhaust gas passes through the substrate in a given period

of time. Appx1322 at ¶ 32; *see also* Appx954 at ¶ 19; Appx956 at ¶ 23 (Dr. Epling describing how AMOx and SCR catalyst function depends on particular reaction conditions). Specifically, as BASF's expert explained, a "high space velocity means higher gas flow, which means a shorter residence time of the gas flow in the catalyst," and, therefore, a lower conversion percentage. *Id.* Accordingly, a particular composition's conversion percentage depends on a number of factors, including the temperature and space velocity.

The '185 patent discloses at least five sets of exemplary reaction conditions to measure SCR conversion percentage and at least three sets of exemplary reaction conditions to measure AMOx conversion percentage. *See, e.g.* '185 patent, col. 2, lines 24-28; *id.* at col. 15, lines 40-49; *id.* at col. 17, lines 59-63 (measuring AMOx catalyst function); *see also id.* at col. 2, lines 40-45; *id.* at col. 2, lines 46-51; *id.* at col. 16, lines 42-45; *id.* at col. 18, lines 16-19; *id.* at col. 18, lines 31-37 (measuring SCR catalyst function). There is no teaching in the '185 patent regarding which of the exemplary conditions to use to measure whether a particular composition falls within the "material composition A" or "material composition B" terms. Moreover, some of those disclosed reaction conditions do not even specify a particular temperature. *See, e.g.*, *id. at* col. 16, lines 42-45 & col. 17, lines 59-63. Therefore, because it was "well-known" that temperature affects catalyst function, *see, e.g.,* Appx1319 at ¶ 23; *see also* '185 patent, col. 12, lines 45-48, the '185 patent actually

discloses *more than* five methods to measure SCR catalyst function and *more than* three methods to measure AMOx catalyst function, because multiple different temperatures could be used for those reaction conditions that don't specify a temperature. Thus, independent of the threshold level of AMOx or SCR function required, the "material composition A" and "material composition B" terms are indefinite because a skilled artisan would not, based on the '185 patent's disclosure, be able to determine whether particular compositions meet that threshold. *See Teva*, 789 F.3d at 1345.

The extrinsic evidence of record confirms that the '185 patent offers no guidance on which of the numerous methods of measurement to use. Johnson Matthey's expert, Dr. Epling, opined that the disclosure of the '185 patent does not provide any single objective standard to measure catalyst function, such as a particular set of reaction conditions for calculating conversion percentage. Appx957 at ¶ 27. BASF's expert, Dr. Crocker, admitted that the '185 patent discloses multiple "exemplary conditions" for evaluating AMOx catalyst function and SCR catalyst function. *See* Appx1323-1324 at ¶¶ 33-34. Dr. Crocker pointed to no evidence that the '185 patent suggests to use any one of those multiple methods, and BASF has never argued that the '185 patent—or anything else, including extrinsic evidence—suggests one method over another. *See* Appx1169 (in its brief accompanying Dr. Crocker's declaration on indefiniteness, BASF arguing that "the '185 patent

discloses a single exemplary method of measuring performance," despite its own expert having said that the '185 patent discloses multiple ways to test catalyst function, *see* Appx1324 at ¶ 34).

Accordingly, it is undisputed that the '185 patent discloses numerous ways to measure both AMOx and SCR catalyst function, that each of the different ways would produce different results, and that the '185 patent does not suggest to a person of ordinary skill which of those methods to use. The claims are therefore indefinite for this additional reason. *See Teva*, 789 F.3d at 1344-45.

2. BASF Has Conceded the Material Facts Demonstrating That the Functional Terms Are Indefinite.

The only argument that BASF makes on this issue is that "because no minimum level of function is required, there is no need to specify any 'particular measurement method.'" Appellant's Brief at 39. But BASF provides no legal support for that argument, citing to nothing more than the district court's opinion *that held the functional terms indefinite*. *Id*. (citing Appx5)

BASF's legal argument does not withstand scrutiny. Even if BASF is correct that the boundary of the functional terms should be extremely broad and include any infinitesimal degree of function, a person of ordinary skill would still need to determine, with reasonable certainty, whether a particular composition falls within that boundary. *See Teva*, 789 F.3d at 1341 ("To determine whether the … claim at issue is indefinite, we look to the patent record—the claims, specification, and

prosecution history—to ascertain if they convey to one of skill in the art with reasonable certainty the scope of the invention claimed.").

No matter where the boundary is set with respect to the required degree of catalyst function (if it even can be set with reasonable certainty), whether a given composition displays enough catalyst function depends on which method of measuring catalyst function is used. *See* Appx1319 at ¶ 23 (BASF's expert, Dr. Crocker, stating that "it was well-known to persons of ordinary skill in the art that the catalytic performance of certain catalysts would vary based on environmental considerations, such as temperature"); *see also* Appx967-957 at ¶ 23-26 (Johnson Matthey's expert describing how chosen reaction conditions determine whether composition displays any catalyst function). The required amount of function is a claimed variable—whether it is any minimal amount of function or some other unspecified amount—and, for the functional terms to be definite, the disclosure of the '185 patent must inform a person of ordinary skill, with reasonably certainty, how to ascertain that claimed variable. *See Teva*, 789 F.3d at 1344-45.

BASF does not dispute that the '185 patent discloses multiple measurement methods, that the different methods would give different results, or that the '185 patent does not provide any guidance to a person of ordinary skill as to which measurement method to use. Accordingly, the claims are indefinite. *See Dow Chem.*, 803 F.3d at 634 (after *Nautilus*, "the existence of multiple methods leading

to different results without guidance in the patent or the prosecution history as to which method should be used renders the claims indefinite"); *see also Dow Chem. Co. v. Nova Chemicals Corp. (Canada)*, 809 F.3d 1223, 1227 (Fed. Cir. 2015) (Moore, J., concurring in denial of petition for rehearing en banc) (burden of proving indefiniteness met by "proving … that multiple measurement techniques exist" and "that one of skill in the art would not know how to choose among them").

CONCLUSION

For the foregoing reasons, the "material composition A" and "material composition B" terms in claim 1, the "material composition" term in claim 5, and the "material composition B" term in claim 17 are indefinite.

Dated: January 19, 2017

Respectfully submitted,

FISH & RICHARDSON P.C.

/s/ Douglas E. McCann

Douglas E. McCann
Martina Tyreus Hufnal
Robert M. Oakes
Patrick D. Cooney
222 Delaware Ave, 17th Floor
Wilmington, DE 19801
Telephone: 302-652-5070
dmcann@fr.com
rmoakes@fr.com
hufnal@fr.com
cooney@fr.com

Attorney for Defendant-Appellee
JOHNSON MATTHEY INC.

CERTIFICATE OF SERVICE

I hereby certify that I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the Federal Circuit by using the appellate CM/ECF system on January 19, 2017.

I certify that all participants in the case are registered CM/ECF users and that service will be accomplished by the appellate CM/ECF system.

/s/ *Douglas E. McCann*
Douglas E. McCann

CERTIFICATE OF COMPLIANCE

The undersigned attorney certifies that Appellee's Brief has a proportionally spaced 14-point typeface, and contains 11,996 words, based on the "Word Count" feature of Microsoft Word, including footnotes and endnotes. Pursuant to Federal Rule of Appellate Procedure 32(a)(7)(B)(iii) and Federal Circuit Rule 32(b), this word count does not include the words contained in the Certificate of Interest, Certificate of Filing and Service, Table of Contents, Table of Authorities, and Statement of Related Cases.

Dated: January 19, 2017

/s/ *Douglas E. McCann*
Douglas E. McCann