

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

CORNING INCORPORATED  
Petitioner

v.

DSM IP ASSETS B.V.  
Patent Owner

---

Case IPR2013-00047  
Patent 6,438,306 B1

---

Before FRED E. McKELVEY, GRACE KARAFFA OBERMANN,  
JENNIFER S. BISK, SCOTT E. KAMHOLZ, and ZHENYU YANG,  
*Administrative Patent Judges.*

McKELVEY, *Administrative Patent Judge.*

FINAL WRITTEN DECISION  
*35 U.S.C. § 318(a) and 37 C.F.R. § 42.73(b)*

I. INTRODUCTION

*A. Background*

This is a final written decision for IPR2013-00047.

The petition (Paper 2 (“Pet.”)) challenges claims 1-14 (all the claims) of U.S. Patent No. 6,438,306 B1 (Ex. 1001) (“the ’306 patent”).

DSM timely filed a preliminary response on February 20, 2013. Paper 10.

On May 13, 2013, a panel of the Board granted the petition as to all proposed grounds of unpatentability urged in the petition. Paper 11 (“Dec.”).

The panel found that Corning had shown a reasonable likelihood that Corning would prevail with respect to the claims challenged in the petition on the following grounds:

<b>Claims Challenged</b>	<b>Basis</b>	<b>Reference(s)<sup>1</sup></b>
1-14	§ 102	Edwards <sup>2</sup>
1-11	§ 102	Coady
1-9 and 12-14	§ 102	Szum

After institution of trial, DSM filed (1) a patent owner response (Paper 40; “Response”) and (2) a supplemental response (Paper 65).

---

<sup>1</sup> The references are: (1) U.S. Patent No. 5,416,880 (Ex. 1002) (“Edwards”); (2) U.S. Patent No. 5,219,896 (Ex. 1003) (“Coady”); and (3) U.S. Patent No. 5,664,041 (Ex. 1004) (“Szum”).

<sup>2</sup> Corning has abandoned its reliance on Edwards. Paper 54, p. 1 n.1. Accordingly, we do not further address Corning’s contentions based on Edwards.

DSM did not file a motion to amend.

Corning filed (1) a reply to DSM's response (Paper 54 ("Reply")) and (2) a supplemental reply (Paper 66).

Both Corning and DSM filed motions to exclude. Paper 69 (DSM) and Paper 72 (Corning).

Both motions to exclude were opposed. Paper 74 (DSM) and Paper 76 (Corning).

Replies were also filed. Paper 79 (DSM ) and Paper 80 (Corning).

Oral argument took place on February 11, 2014. *See* Paper 83.

The Board has jurisdiction. 35 U.S.C. § 6(c).

This final written decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

Corning has failed to show by a preponderance of the evidence that any of challenged claims 1-14 of the '306 patent are unpatentable.

*B. Related proceedings*

Corning and DSM are simultaneously involved in nine other *inter partes* reviews based on patents claiming similar subject matter:

- (1) IPR2013-00043; (2) IPR2013-00044; (3) IPR2013-00045;
- (4) IPR2013-00046; (5) IPR2013-00048; (6) IPR2013-00049;
- (7) IPR2013-00050; (8) IPR2013-00052; and (9) IPR2013-00053.

*C. The '306 patent*

The '306 patent is titled "Radiation Curable Resin Composition" and relates to coated optical fiber having a cured coating prepared from a radiation curable composition said to have improved cure speed without deteriorating yellowing performance of the cured coating. Ex. 1001, 1:11-14.

The '306 patent (2:51-65) explains:

The present invention provides a coated optical fiber comprising a glass optical fiber with a single protective coating or a combination of an inner and an outer primary coating applied thereon and optionally with a colored coating subsequently applied thereon wherein the inner primary coating or at least a portion of the single coating is prepared from a radiation curable composition which when cured as a capillary film with a 100 W medium pressure mercury lamp has a percentage reacted acrylate unsaturation of at least about 54% after exposure to a dose of about 4.4 mJ/cm<sup>2</sup> or wherein the outer primary coating is prepared from a radiation curable composition which when cured as a capillary film with a 100 W medium pressure mercury lamp has a percentage reacted acrylate unsaturation of at least about 56% after exposure to a dose of about 4.4 mJ/cm<sup>2</sup>.

Claim 1 of the '306 patent reads (paragraphing added):

1. Coated optical fiber comprising a glass optical fiber with

[1(a)] a single protective coating or

[1(b)] a combination of an inner and an outer primary coating [composition] applied thereon and

[2] optionally with a colored coating subsequently applied thereon

[2(a)] wherein the inner primary coating or at least a portion of the single [protective] coating is prepared from a radiation curable composition which when cured as a capillary film with a 100 W medium pressure mercury lamp has a percentage reacted acrylate unsaturation [(%RAU)] of at least about 54% after exposure to a dose of about 4.4 mJ/cm<sup>2</sup> or

[2(b)] wherein the outer primary coating is prepared from a radiation curable composition which when cured has a

capillary film with a 100 W medium pressure mercury lamp has a percentage reacted acrylate unsaturation [(%RAU)] of at least about 56% after exposure to a dose of about 4.4 mJ/cm<sup>2</sup>.

## II. ANALYSIS

### *A. Claim construction*

As a step in our analysis for determining whether the challenged claims are unpatentable, we determine the meaning of the claims. Paper 11, Dec. 4-5.

Claims of an unexpired patent are interpreted using the broadest reasonable construction in light of the specification of the patent. 37 C.F.R. § 42.100(b); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012).

The dispositive claim limitations of the '306 patent are limitations [2(a)] and [2(b)], as set out in claim 1 reproduced above.

Corning has failed to prove by a preponderance of the evidence that the prior art inherently describes either limitation.

Under the claim construction Corning proposed in its Petition (Pet. 14-16), Corning has failed to prove its case; accordingly, there is no occasion for further construction of the %RAU language of limitations [2(a)] and [2(b)] in claim 1.

### *B. The position of the parties*

We understand that Corning and DSM agree that both Coady and Szum describe elements [1(a)], [1(b)], and [2], as set out in claim 1 reproduced above.

We further understand that Corning acknowledges that properties [2(a)] and [2(b)], as set out in claim 1 reproduced above, are not explicitly described by Coady or Szum '041.

However, Corning maintains that properties [2(a)] and [2(b)] are inherently described in compositions described by Coady (Coating Z) and Szum (Examples 4 and 5B). DSM disagrees.

*C. Pre-petition experiments*

Corning concedes that Coady and Szum do not explicitly describe the %RAU limitations set out in paragraphs [2(a)] and [2(b)] of claim 1 of the '306 patent.

Corning undertook pre-petition experimental tests in an attempt to establish that limitations [2(a)] and [2(b)] are inherently described in the prior art.

However, Corning has abandoned, and no longer relies on, its pre-petition experimental work. Paper 83, p. 33:18 to p. 34:5.

Accordingly, we do not address evidence and argument related to the sufficiency of Corning's pre-petition experiments relied upon in the petition.

*D. Post-DSM Response experiments*

To overcome perceived deficiencies in its case, with its Reply Corning submitted (1) evidence based on post-petition experimental tests and (2) testimony of three witnesses who did not testify in support of the Petition (hereinafter "new" evidence").

In its motion to exclude, DSM asks us not to consider the “new” evidence. Paper 69, 1-2.<sup>3</sup>

*E. Analysis of the “new” evidence*

*1. “New” evidence*

The “new” evidence which DSM asks us not to consider includes material we identify as Items 1-3.

Item 1 relates to pre-petition tests relied upon by Corning in support of its petition.

Since Corning no longer relies on its pre-petition experimental tests, we do not need to consider the admissibility of the pre-petition experimental tests.

DSM’s motion to exclude will be *dismissed* as to Item 1.

Item 2 relates to opinions of Dr. Sogah relating to the appropriateness of certain chemical substitutions made by Corning when it undertook experiments to reproduce Coating Z, as described by Coady. *See* Ex. 1060 ¶¶ 79-82).

---

<sup>3</sup> Challenging evidence as being improper reply evidence through a motion to exclude is now disfavored. *Liberty Mutual Ins. Co. v. Progressive Casualty Ins. Co.*, CBM2012-00002, Paper 66), 62:1-4 (PTAB Jan. 23, 2014) (“[w]hile a motion to exclude may raise issues related to admissibility of evidence, . . . [it] is not a mechanism to argue that a reply . . . relies on evidence necessary to make out a prima facie case.”). We consider DSM’s challenge in this case only because we instructed DSM to file a motion to exclude. Paper 57, 4-5 (Dec. 9, 2013). A motion to exclude similar to that filed by DSM in this case may not be permitted in future cases. The proper way to challenge “new” evidence in a reply is to bring it to the Board’s attention in a conference call or during oral argument.

According to DSM, the Sogah opinions (1) raise new issues, (2) present new evidence, and (2) improperly rely on patent disclosures to prove the truth of matters asserted therein.

Item 3 relates to “New %RAU Data” presented with Corning’s Reply.

The “New %RAU Data” refers to evidence relating to Corning’s %RAU testing conducted *after* Corning submitted its Petition and includes (1) Paragraphs 33-48, the last two sentences of Paragraph 55, and Paragraphs 56-83 of the Responsive Winningham Declaration (Ex. 1027), (2) Paragraphs 24-49 of a Pollack Declaration (Ex. 1028), including his opinions relating to whether the light-curing systems Corning used for its %RAU testing fall within the scope of the claims of the ’306 patent, (3) Exhibits 1035-1052 and 1058, (4) *at least* Paragraph 106 of the Sogah Declaration (Ex. 1060), and (5) a Reichmanis Declaration in its entirety. Paper 69, p. 1 n.2.

## 2. *Petition*

The %RAU limitations in the claims of the ’306 patent are not *explicitly* described in the Coady or Szum ’041 patents.

To overcome the lack of an explicit disclosure, with its Petition, Corning submitted the direct declaration testimony of (1) Ms. Inna I. Kouzmina (Ex. 1006) and (2) Dr. Michael Winningham (Ex. 1005).

The testimony is said to establish that %RAU limitations are inherently described in Coady and Szum.

The testimony is based in part on pre-petition experimental testing of Coady Coating Z. Ex. 1006 ¶ 19; Ex. 1003, Table IV.

In describing the testing, Kouzmina acknowledged that there are two differences between (1) the composition tested and (2) the composition



described by Coady: (1) Nippollan-981 was used in place of Permanol KM10-1733 (said to be no longer commercially available), and (2) Photomer 4066 was used in place of Aronix M-113. Ex 1006 ¶ 20 n.2 and ¶ 21 n.3.

Kouzmina further testified with respect to pre-petition experimental testing of compositions described in Example 4 and Example 5B of Szum. Ex. 1006 ¶¶ 22-28; Ex. 1004, col. 11 (Example 4) and cols. 11-12 (Example 5B—see Table 1).

Kouzmina still further described a protocol for testing the reproduced Coady and Szum compositions for %RAU. Ex. 1006 ¶¶ 29-40.

Based on the pre-petition protocol and testing, Kouzmina concluded that Coady Coating Z and the compositions of Examples 4 and 5B of Szum meet the %RAU limitations set out in the claims of the '306 patent. Ex. 1006 ¶40.

Winningham agreed with the Kouzmina protocol and %RAU test results. Ex. 1005 ¶¶ 61-62.

### *3. DSM's Preliminary Response*

DSM timely filed a Preliminary Response. Paper 10.

A patent owner may present argument and documentary evidence in support of a Preliminary Response.

However, the rules do not authorize the patent owner to “present new testimony evidence beyond that already of record . . . .” 37 C.F.R. § 42.107(c).

In its Preliminary Response, DSM argued that the Kouzmina “tests and calculations regarding %RAU are . . . defective” for not following the

calculation method laid out in the '306 patent and for not disclosing the test data underlying the calculations. Paper 10, 2, 14-17, 19-20, 22.

#### 4. *Decision to institute*

In due course, a panel entered a decision to institute this *inter partes* review. Paper 11.

The Board addressed, but on the record presented at that time declined to accept, DSM's preliminary response %RAU arguments. *See, e.g.*, Paper 11, 6, 8, 10-13, 15.

#### 5. *DSM's Response*

Prior to filing the Response, DSM cross-examined Kouzmina (Exs. 2019-23) and Winningham (Exs. 2024-28).

Thereafter, DSM timely filed a Response. Paper 10.

In support of its Response, DSM offered the direct declaration testimony of Dr. Christopher N. Bowman. Ex. 2029.

Based at least in part on Bowman's testimony, the Response challenged Corning's %RAU tests results as being "fatally flawed." Response, Paper 40, 8; *see also* Ex. 2029 ¶¶ 50-66 (%RAU discussion).

DSM's challenge addressed *inter alia* (1) a need for a linear relationship between dose and exposure time (Paper 10, 22-25) and (2) proportionality of dose versus time (Paper 10, 25-32).

#### 6. *Corning's Reply*

The rules authorize a petitioner to file a Reply to a patent owner's Response. 37 C.F.R. § 42.23(a); 37 C.F.R. § 42.120.

In its Reply, Corning states that "[u]pon review of the issues raised by DSM, an inquiry was made [by Corning] to determine whether there were

any potential errors in the way . . . exposure times were determined.”

Paper 54, 7.

Exposure conditions are relevant to measuring %RAU.

Two sources of error are said to have been identified. Paper 54, 7. *See also* Ex. 1027 ¶¶ 52-55 (explaining why additional %RAU testing was performed on (1) Coady Coating Z and (2) the compositions of the Examples 4 and 5B of Szum).

In support of its Reply, Corning offered the direct declaration testimony of three *new* witnesses:

- (1) Dr. Clifford R. Pollock (Ex. 1028);
- (2) Ms. Elsa Reichmanis (Ex. 1059); and
- (3) Dr. Dotsevi Y. Sogah (Ex. 1060).

According to Corning, the testimony directly responds to concerns expressed by DSM through Bowman.

Based on the new testimony, Corning attempts to explain why (1) additional %RAU testing establishes that the Coady and Szum compositions inherently meet the %RAU limitations of the '306 patent claims and (2) substitution of ingredients to make the Coady Coating Z composition was appropriate.

DSM cross-examined (1) Pollack (Ex. 2062), (2) Reichmanis (Exs. 2076-77) and (3) Sogah (Ex. 2064-65).

In addition to discussion in papers associated with DSM's motion to exclude, DSM's request that we not consider the “new” evidence was discussed at oral argument with questioning by all judges.

In considering DSM's request that we not consider the “new” evidence, we limit our analysis to (1) the exhibits and (2) the paragraphs of

the Kouzmina, Winningham, and Sogah declarations specifically identified by DSM in its motion to exclude.

7. *DSM position on Item 2*

DSM argues that Sogah's testimony addressing substitution of (1) Nippollan-981 for Permanol KM10-1733 and (2) Photomer 4066 for Aronix M-133—used to reproduce Coady Composition Z—should not be considered.

Sogah testified that it was appropriate to substitute Nippollan N-981 for Permanol KM10-1733 because each has the same CAS Registry Number 24937-06-2 and generic formula and therefore are the same component. Ex. 1060 ¶ 80.

Sogah also testified based on (1) WO 1992/008747 A1 (Ex. 1062) and (2) knowledge of the structure of the polycarbonate diol, that he was able to estimate the number of repeating units and that Permanol KM10-1733 has a molecular weight of 981. *Id.*

Sogah suggested that the 981 in Nippollan N-981 may be a designation of molecular weight.

According to Sogah, it is sometimes industry practice to use numbers in product names to designate molecular weight.

Sogah testified that Coady describes Aronix M-113 as having the same structure as Photomer 4003. Ex. 1060 ¶ 81; Ex. 1003 (Table IV “Photomer 4003\*\*\*” and “\*\*\* [s]ame structure as Aronix M-113”).

Sogah further testified that the CAS registry number for Photomer 4066 is the same as that of Photomer 4003.

Based on Coady and the CAS numbers, Sogah opined that Photomer 4066 (used by Corning) is the same as Aronix M-113 (described as having been used by Coady). Ex. 1060 ¶ 81.

We understand CAS registry number to be a unique numerical identifier assigned by the Chemical Abstracts Service to chemical substances described in the open scientific literature, including organic compounds. *See* Paper 83, 24:8-18.

We find that Sogah has not relied on Coady to prove the truth of statements set out therein.

Rather, Sogah relies on what is described by Coady to explain the underlying basis of his opinion that two components with different names are the same component.

The same is true of Sogah's reliance on the WO 92/008747 A1 (Ex. 1062).

The weight to be given the opinion based on Coady and the PCT publication is another matter.

Corning offered Coady to provide underlying support for Sogah's opinion. FED. R. EVID. 703.

Sogah's testimony is proper reply testimony. *Cf. Liberty Mutual Ins. Co., supra* n.3 at 65 ("To rebut Mr. Ehsani's assertions regarding Kosaka's Figures 10 and 11, it would be reasonable for Mr. Andrews's rebuttal testimony to address *those same figures.*") (italics added).

We decline DSM's request to exclude the Item 2 evidence.

#### 8. DSM position on Item 3

According to DSM, the "new" %RAU analysis should not be considered for at least the following reasons.

*First*, Corning is relying on the “new” %RAU analysis to make out a “prima facie” case of unpatentability.

*Second*, the “new” %RAU analysis could, and should, have been presented with the Petition.

*Third*, because the “new” %RAU analysis was not presented with the Petition, DSM has had no opportunity to respond to the evidence that now goes to the heart of Corning’s allegations of unpatentability.

### 9. Discussion

The rationale urged for non-consideration is based on our trial rules, including our rule relating to replies. 37 C.F.R. § 42.23(b) (“A reply may only respond to arguments raised in the . . . patent owner response.”).

Practice relating to replies is addressed in our Office Patent Trial Practice Guide. 77 Fed. Reg. 48,756, 48,767 (Aug. 14, 2012):

A reply may only respond to arguments raised in the corresponding opposition [, in this case DSM’s response]. [37 C.F.R.] § 42.23. While replies can help crystalize issues for decision, a reply that raises a new issue or belatedly presents evidence will not be considered and may be returned. The Board will not attempt to sort proper from improper portions of the reply. Examples of indications that a new issue has been raised in a reply include new evidence necessary to make out a *prima facie* case for the patentability or unpatentability of an original or proposed substitute claims, and new evidence that could have been presented in a prior filing.

There came a time when Corning says it made an inquiry “to determine whether there were any potential errors in the way . . . exposure times [to ascertain %RAU’s] were determined.” Paper 54, 7.

Two sources of error are said to have been identified, albeit when the errors were identified is not entirely clear. Paper 54, 8; Ex. 1027 ¶¶ 51-55.

According to Winningham (Ex. 1027, ¶ 55):

As a result of the limitations associated with using the EPM2000/PM3 meter in energy mode to measure such low doses and the error in not factoring in the beam area, the exposure times required to achieve the measured 2.9 mJ/cm<sup>2</sup> and 4.4 mJ/cm<sup>2</sup> doses as determined using the EPM200/PM3 meter were overstated.

As a result, “too high a dose was used.” Paper 54, 8.

It was only after DSM raised issues associated with proper %RAU testing that Corning submitted “new” arguments based on “new” evidence with its Reply.

Corning argues that the “new” evidence addresses points made in DSM’s Response.

But, unexplained by Corning is when DSM was to have an opportunity to develop and submit “new” rebuttal evidence.

Belated submission by Corning of its Item 3 “new” evidence at the reply stage in this *inter partes* review strikes us as prejudicial to DSM.

The reader may wonder: Can any evidence be submitted with a reply?

The answer is “yes.” *See Liberty Mutual Ins. Co., supra* n. 3 at 65.

In the case before us, both Winningham and Kouzmina testified that the substitution of ingredients in reproducing Coady Coating Z was proper. Ex. 1005 ¶ 57 n.3; Ex 1006 ¶¶ 20 n.2 and 21 n.3.

In its Response, DSM challenged Winningham and Kouzmina.

In particular, DSM noted that substitutions were made in reproducing Coady Coating Z, yet modulus measurements resulted in different modulus numbers. Paper 47, 41.

The implication is that the modulus measurements should have resulted in the same modulus.

To respond to a supposed difference in modulus measurements, Corning offered rebuttal testimony of Sogah. Paper 54, 14.

*First*, Sogah testified that the ingredients substituted for the Coady listed ingredients have the same CAS Registry Number and therefore are the same ingredients. Ex. 1060 ¶ 81.

*Second*, Sogah testified that Coady Coating Z modulus is a “Young’s modulus, secant modulus, or segment modulus.” *Id.* ¶ 83.

The modulus reported by Corning is an “equilibrium modulus.” *Id.* Hence, Sogah would have expected reported modulus values to be different.

The Sogah testimony responds to testimony relied upon by DSM.

On the other hand, the Corning Item 3 “new” evidence sought to be “excluded” relies on post-petition and post-patent owner response %RAU testing using a protocol different from that use for the %RAU testifying offered with the Petition.

It is true that both the “old” evidence and the “new” evidence generally relate to %RAU testing.

However, the basis for establishing %RAU inherency in Corning’s Reply is a new protocol (*i.e.*, a new theory) for %RAU testing.

It does more than merely respond to, or rebut, points made in DSM’s Response.

The new protocol, in effect, restarts the case.

To permit consideration of the “new” evidence would, in our judgment, be unfair to DSM—absent a possible rebuttal period which might



have been ordered had Corning timely sought leave to file supplemental information.

We do not believe it to be in the interest of justice at this late stage of the case to impose additional financial expense on DSM to respond to the “new” evidence it asks us not to consider.

As will become apparent, our decision not to consider the “new” evidence submitted for the first time in Corning’s Reply is dispositive of the case on the merits.

*Inter partes* review proceedings must be fair to both parties, including a patent owner—where properties rights can be extinguished through cancellation of patent claims.

The Director has established rules designed to secure the just, speedy, and inexpensive resolution of trials in *inter partes* review proceedings. 37 C.F.R. § 42.1(b).

We interpret the rules (as well as our Office Patent Trial Practice Guide) in the context of proceedings before the Board. *Cf. FirstHealth, Inc. v. CareFirst*, 479 F.3d 825, 829 (Fed. Cir. 2007) (The TTAB has discretion to reasonably interpret the meaning of “excusable neglect” in the context of its own regulations. (citing *Thomas Jefferson Univ. v. Shalala*, 512 U.S. 504, 512 (1994) (An agency’s interpretation of its own regulation is given controlling weight unless it is plainly erroneous or inconsistent with the regulation.)).

Based on our interpretation of our rules, we have determined that Corning’s “new” evidence in support of its unpatentability position should not be considered.

In the context of the facts of this case, we hold that:

(1) Corning's "new" evidence, and arguments based thereon, respond to more than the arguments made in DSM's Response, and instead effectively "restarts the case";

(2) After the Reply stage of the proceeding, DSM did not have a "fair" opportunity, and should not now be required to spend additional recourses, to develop and present counter evidence; and

(3) Corning's "new" evidence was not properly submitted under our rules and will be denied consideration.

*F. Resolution of case*

Corning has no viable evidence upon which it can rely to sustain its burden of establishing that the %RAU limitations of the claims of the '306 patent are inherently described in Coady or Szum.

Based on the evidence entitled to be considered, Corning has not established that the %RAU limitation is inherently described by either Coady or Szum.

As a result, Corning has failed to sustain its burden of proof.

III. CORNING MOTION TO EXCLUDE

Corning has filed a motion to exclude evidence offered by DSM. Paper 72.

DSM has opposed. Paper 74.

Corning filed a reply. Paper 80.

Because Corning has failed to make out a case for relief, we have not found it necessary to consider the DSM evidence sought to be excluded in Corning's motion to exclude.

Accordingly, Corning's motion to exclude will be *dismissed*.

IV. JUDGMENT

Upon consideration of the record, and for the reasons given, it is:

ORDERED that Corning's request for cancellation of claims 1-14 of the '306 patent is *denied*;

FURTHER ORDERED that Corning's motion to exclude is *dismissed*;

FURTHER ORDERED that DSM's motion to exclude is (1) *dismissed* as to Item 1, (2) *denied* as to Item 2, and (3) *granted* as to Item 3.

FURTHER ORDERED that because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2013-00047  
Patent 6,438,306 B1

PETITIONER:

Michael Goldman  
[Michael.goldman@leclairryan.com](mailto:Michael.goldman@leclairryan.com)

Jeffrey Townes  
[Jeffrey.townes@leclairryan.com](mailto:Jeffrey.townes@leclairryan.com)

Edwin Merkel  
[Edwin.merkel@leclairryan.com](mailto:Edwin.merkel@leclairryan.com)

PATENT OWNER:

Sharon Israel  
[sisrael@mayerbrown.com](mailto:sisrael@mayerbrown.com)

Joseph Mahoney  
[jmahoney@mayerbrown.com](mailto:jmahoney@mayerbrown.com)