IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

CARL B. COLLINS and FARZIN DAVANLOO, Plaintiffs,	§	
v.	§	CIVIL ACTION NO. 2:09-cv-219-TJW
WESTERN DIGITAL TECHNOLOGIES, INC., et al., Defendants.	§	

MEMORANDUM OPINION AND ORDER

I. INTRODUCTION

Plaintiffs Carl Collins and Farzin Davanloo (collectively "Plaintiffs") filed suit on July 15, 2009, alleging that Western Digital Technologies, Inc., ("Western Digital"), Hitachi, Ltd. ("Hitachi"), Hitachi America, Ltd. ("Hitachi America"), Hitachi Global Storage Technologies, Inc. ("Hitachi Global Storage") (collectively, Hitachi, Hitachi America, and Hitachi Global Storage shall be referred to as the "Hitachi Defendants"), Toshiba Corporation ("Toshiba"), Toshiba America, Inc. ("Toshiba America"), Toshiba America Information Systems, Inc. ("Toshiba American Information") (collectively, Toshiba, Toshiba America, and Toshiba American Information shall be referred to as the "Toshiba Defendants"), Buffalo Inc. ("Buffalo"), Buffalo Technology (USA), Inc. ("Buffalo Technology") (collectively, Buffalo and Buffalo Technology shall be referred to as the "Buffalo Defendants"), EMC Corporation ("EMC"), Imation Corp. ("Imation"), La Cie, S.A. ("La Cie"), La Cie, Ltd. ("La Cie USA") (collectively, La Cie and La Cie USA shall be referred to as the "La Cie Defendants"),

Systemax, Inc. ("Systemax"), Compusa.com Inc. ("CompUSA"), J & R Electronics, Inc. ("J & R Electronics), and TigerDirect, Inc. ("TigerDirect"), (collectively "Defendants") infringe U.S. Patent Nos. 5,411,797 ("the '797 patent") and 5,478,650 ("the '650 patent"). On June 16, 2011, the Court held a claim construction hearing where the parties presented oral arguments regarding the disputed terms. The Court previously construed a number of the terms at issue in this case in *Collins et al. v. The Gillette Co.*, No. 2:04-cv-38 (E.D. Tex.) ("*Gillette*"). In *Gillette*, the Court reviewed briefing from the parties, held a claim construction hearing, and issued an order construing five terms of the asserted patents. This order will first briefly address the technology at issue in the case and then turn to the merits of the claim construction issues.

II. BACKGROUND OF THE TECHNOLOGY

The patents-in-suit are titled "Nanophase Diamond Films." Both patents disclose films of nanometer-scale nodules of diamond-bonded carbon structures. The invention claimed is "an amorphous or ultra fine-grained, diamond-like material that is substantially free of graphite and hydrogen, and is deposited in a film on a substrate in the form of nanometer-sized, tightly packed nodules of sp^3-bonded carbon, hereinafter referred to as 'nanophase diamond.'" '797 patent, 1:16-21. The '650 patent is a divisional of the '797 patent. The patents have materially identical specifications. The abstract for the '797 patent states:

> Films of nanometer-scale nodules of diamond-bonded carbon structures are disclosed. Such films may be used, for example, to coat objects to improve their resistance to wear. Moreover, because the nanophase diamond films of the present invention are of optical quality, they may be used to coat optical lenses and the like. The nanophase diamond films of the present invention have diamond-like properties, indicating a preponderance of sp^3 bonds within the nodules and a substantial absence of hydrogen and graphite within the nodules. If desired, the nanophase diamond films disclosed herein may be created to have a hardness exceeding that of natural diamond, depending on the quantity of graphite left in the voids

> between the nodules. The nanophase diamond films of the present invention are also characterized by a low coefficient of friction, by low average internal stress, and by an optical quality capable of providing a visual appearance of Newton's rings of interference.

As an exemplary claim, claim 1 of the '797 patent is reproduced below:

> 1. A nanophase diamond film, comprising nodules of carbon bonded predominantly in three dimensional sp^3 bonds, said film comprising less than about 20% hydrogen, having an imaginary index of refraction less than 0.5 for a light wavelength of about 632.8 nm, and said nodules having a diameter of less than about 500 angstroms.

III. GENERAL PRINCIPLES GOVERNING CLAIM CONSTRUCTION

"A claim in a patent provides the metes and bounds of the right which the patent confers on the patentee to exclude others from making, using or selling the protected invention." *Burke, Inc. v. Bruno Indep. Living Aids, Inc.*, 183 F.3d 1334, 1340 (Fed. Cir. 1999). Claim construction is an issue of law for the court to decide. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970-71 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996).

To ascertain the meaning of claims, the Court looks to three primary sources: the claims, the specification, and the prosecution history. *Markman*, 52 F.3d at 979. The specification must contain a written description of the invention that enables one of ordinary skill in the art to make and use the invention. *Id.* A patent's claims must be read in view of the specification, of which they are a part. *Id*. For claim construction purposes, the description may act as a sort of dictionary, which explains the invention and may define terms used in the claims. *Id*. "One purpose for examining the specification is to determine if the patentee has limited the scope of the claims." *Watts v. XL Sys., Inc.*, 232 F.3d 877, 882 (Fed. Cir. 2000).

Nonetheless, it is the function of the claims, not the specification, to set forth the limits of the patentee's invention. Otherwise, there would be no need for claims. *SRI Int'l v. Matsushita*

Elec. Corp., 775 F.2d 1107, 1121 (Fed. Cir. 1985) (en banc). The patentee is free to be his own lexicographer, but any special definition given to a word must be clearly set forth in the specification. *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1388 (Fed. Cir. 1992). Although the specification may indicate that certain embodiments are preferred, particular embodiments appearing in the specification will not be read into the claims when the claim language is broader than the embodiments. *Electro Med. Sys., S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994).

This Court's claim construction decision must be informed by the Federal Circuit's decision in *Phillips v. AWH Corporation*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). In *Phillips*, the court set forth several guideposts that courts should follow when construing claims. In particular, the court reiterated that "the *claims* of a patent define the invention to which the patentee is entitled the right to exclude." 415 F.3d at 1312 (emphasis added) (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). To that end, the words used in a claim are generally given their ordinary and customary meaning. *Id*. The ordinary and customary meaning of a claim term "is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id*. at 1313. This principle of patent law flows naturally from the recognition that inventors are usually persons who are skilled in the field of the invention and that patents are addressed to and intended to be read by others skilled in the particular art. *Id*.

The primacy of claim terms notwithstanding, *Phillips* made clear that "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the

specification." *Id*. Although the claims themselves may provide guidance as to the meaning of particular terms, those terms are part of "a fully integrated written instrument." *Id*. at 1315, *quoting Markman*, 52 F.3d at 978. Thus, the *Phillips* court emphasized the specification as being the primary basis for construing the claims. *Id*. at 1314-17. As the Supreme Court stated long ago, "in case of doubt or ambiguity it is proper in all cases to refer back to the descriptive portions of the specification to aid in solving the doubt or in ascertaining the true intent and meaning of the language employed in the claims." *Bates v. Coe*, 98 U.S. 31, 38 (1878). In addressing the role of the specification, the *Phillips* court quoted with approval its earlier observations from *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998):

> Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim. The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction.

Phillips, 415 F.3d at 1316. Consequently, *Phillips* emphasized the important role the specification plays in the claim construction process.

The prosecution history also continues to play an important role in claim interpretation. Like the specification, the prosecution history helps to demonstrate how the inventor and the PTO understood the patent. *Id.* at 1317. Because the file history, however, "represents an ongoing negotiation between the PTO and the applicant," it may lack the clarity of the specification and thus be less useful in claim construction proceedings. *Id*. Nevertheless, the prosecution history is intrinsic evidence that is relevant to the determination of how the inventor understood the invention and whether the inventor limited the invention during prosecution by

narrowing the scope of the claims. *Id.*

Phillips rejected any claim construction approach that sacrificed the intrinsic record in favor of extrinsic evidence, such as dictionary definitions or expert testimony. The *en banc* court condemned the suggestion made by *Texas Digital Systems, Inc. v. Telegenix, Inc.*, 308 F.3d 1193 (Fed. Cir. 2002), that a court should discern the ordinary meaning of the claim terms (through dictionaries or otherwise) before resorting to the specification for certain limited purposes. *Phillips*, 415 F.3d at 1319-24. The approach suggested by *Texas Digital*—the assignment of a limited role to the specification—was rejected as inconsistent with decisions holding the specification to be the best guide to the meaning of a disputed term. *Id*. at 1320-21. According to *Phillips*, reliance on dictionary definitions at the expense of the specification had the effect of "focus[ing] the inquiry on the abstract meaning of words rather than on the meaning of claim terms within the context of the patent." *Id*. at 1321. *Phillips* emphasized that the patent system is based on the proposition that the claims cover only the invented subject matter. *Id.* What is described in the claims flows from the statutory requirement imposed on the patentee to describe and particularly claim what he or she has invented. *Id*. The definitions found in dictionaries, however, often flow from the editors' objective of assembling all of the possible definitions for a word. *Id*. at 1321-22.

Phillips does not preclude all uses of dictionaries in claim construction proceedings. Instead, the court assigned dictionaries a role subordinate to the intrinsic record. In doing so, the court emphasized that claim construction issues are not resolved by any magic formula. The court did not impose any particular sequence of steps for a court to follow when it considers disputed claim language. *Id*. at 1323-25. Rather, *Phillips* held that a court must attach the appropriate weight to the intrinsic sources offered in support of a proposed claim construction,

bearing in mind the general rule that the claims measure the scope of the patent grant. Having read the parties' papers and carefully considered their arguments and the relevant legal authority, the Court hereby rules as follows

IV. AGREED CONSTRUCTIONS

Based upon the joint submission of claim construction charts and subsequent arguments in briefing and at the claim construction hearing, the following terms of the patent have been agreed to by the parties.

1. "20% hydrogen"

Claim language	Agreed Construction
"20% hydrogen"	"20 atomic % hydrogen"

The phrase "20% hydrogen" is used in claim 1 of the '797 patent and claim 1 of the '650 patent. A review of the intrinsic evidence leads the Court to conclude that the parties' agreed construction is how a person of ordinary skill in the art would interpret the claim term. Therefore, the Court adopts the parties' agreed construction.

2. "bonded predominately in three dimensional sp^3 bonds"

Claim language	Agreed Construction
"bonded predominately in three dimensional sp^3 bonds"	"approximately 95% or more of the bonds between the carbon atoms in each nodule are three dimensional sp^3 bonds"

The term "bonded predominately in three dimensional sp^3 bonds" appears in claim 1 of the '797 patent and claims 1 and 4 of the '650 patent. A review of the intrinsic evidence leads the Court to conclude that the parties' agreed construction is how a person of ordinary skill in the art would interpret the claim term. Therefore, the Court adopts the parties' agreed construction.

3. "having an imaginary index of refraction less than 0.5 for light wavelength of about 632.8 nm" and "about"

In their response, Defendants informed the Court that there was no longer a need to construe the phrase "having an imaginary index of refraction less than 0.5 for light wavelength of about 632.8 nm" and the term "about." (Dkt. No. 294 at 15.)

V. TERMS IN DISPUTE OF THE PATENTS-IN-SUIT

The parties have identified five disputed terms or phrases.

1. "nodules"

Claim Term or Phrase	Plaintiffs' Proposed Construction	Defendants' Proposed Construction
"nodules"	"Clusters of carbon atoms of rounded or irregular shape . . ."	Indefinite.

The Court construes "nodules" as "clusters of carbon atoms of rounded or irregular shape."

A. Parties' Construction Arguments

The parties dispute whether the term "nodules" is indefinite. Defendants contend that the term is indefinite because the lower boundary for the size of a nodule cannot be determined, the diameter of a nodule will vary depending on the testing method, and nodules cannot be differentiated from other nanophase elements. Plaintiffs' proposed construction is the one determined by the Court in *Gillette.*

B. Analysis

To begin its analysis, the Court first turns to the language of the claims, as it provides "substantial guidance as to the meaning of particular claim terms." *Phillips*, 415 F.3d at 1313

(citing *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). The term "nodules" appears in claims 1 and 2 of the '797 patent and claims 1 and 4 of the '650 patent. The term is used consistently in each patent and throughout the claims. Moreover, the claim language itself indicates that a nodule is a cluster of carbon atoms bonded together. For example claim 1 of the '797 patent recites "nodules of carbon bonded." With this in mind, the Court next turns to the specification as it "is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Id.* at 1315 (citation omitted).

The specification of the '797 patent states that "it is understood that the nanophase diamond film comprises substantially dehydrogenated nodules of sp^3-bonded carbon (i.e., fine-grained clusters having dimensions of 100-1000 angstroms and preferably less than 500 angstroms)." '797 patent, 6:64-68. Thus, the specification also indicates that nodules are clusters of carbon atoms. In addition, the specification states that "[t]he basic unit of construction of the nanophase diamond of the present invention is the sp^3-bonded nodule…[t]he nodules lack coherent ordering, probably because they contain a random alternation of the cubic and hexagonal polytypes of diamond…[w]ith electron diffraction, [the nodules] appear amorphous." '797 patent, 4:27-35. In addition, Figure 6 of the patents-in-suit illustrates "a photograph of diamond nodules." '797 patent, Fig. 6. As the Court stated in *Gillette*, a picture is worth a thousand words, and Figure 6 depicts "nodules" that are clearly rounded in shape and others that are irregular in shape. Figure 6 also includes a 0.2 μm scale as reference to indicate the size of the nodules included in the figure. Thus, the specification indicates that nodules may have rounded or irregular shape, and need not be perfectly round as implied by Defendants.

Defendants contend that the term "nodules" is indefinite because it is not possible for one of ordinary skill in the art to distinguish a "cluster of carbon atoms" from a collection of carbon atoms that is not a "cluster." In other words, the term is indefinite because the lower bound for the size of "nodules" cannot be determined. First, there is no requirement that the term "nodules" be defined with "mathematical precision" to be definite. *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 424 F.3d 1374, 1384 (Fed. Cir. 2005) ("a patentee need not define his invention with mathematical precision in order to comply with the definiteness requirement"); *Exxon Res. & Eng'g Co. v. U.S.*, 265 F.3d 1371, 1381 (Fed. Cir. 2001) ("mathematical precision is not required [for definiteness] - only a reasonable degree of particularity and definiteness"). Moreover, the claim language itself indicates to one of ordinary skill in the art the size of the nodules that fall within the scope of the claims. Specifically, claim 1 of '797 recites "nodules having a diameter of less than about 500 angstroms." Claim 2 adds a further limitation that "said nodules having a diameter less than about 200 angstroms." Thus, the claim language explicitly states that the patentee's right to exclude starts when the diameter of the nodules is less than about 500 angstroms. Defendants' "lower bound" argument is nothing more than an attempt to read a limitation into the claim.

The Court also rejects Defendants' argument that a diameter of an irregular nodule could not be measured definitively. The term "diameter" is commonly understood to mean "the length of a straight line through the center with end points at the perimeter." As illustrated in Figure 6, the diameters of the nodules can be determined even though they are irregularly shaped. And contrary to Defendants' contention, the specification indicates that Figure 6 is an embodiment of the present invention. Finally, Defendants' argument that nodules cannot be differentiated from

other nanophase elements is unpersuasive. Accordingly, for the reasons stated above, the Court construes "nodules" as "clusters of carbon atoms of rounded or irregular shape."

2. "nanophase diamond film"

Claim Term or Phrase	Plaintiffs' Proposed Construction	Defendants' Proposed Construction
"nanophase diamond film"	"A film having nanometer-scale nodules of diamond-bonded carbon displaying characteristics similar to that of diamond."	Plaintiffs' proposed construction would render this phrase indefinite. Defendants instead propose that the phrase be construed as: "A film that is at least 75% diamond-bonded carbon and that is made of tightly packed nanometer-scale nodules of diamond-bonded carbon."

The Court construes "nanophase diamond film" as "a film having nanometer-scale nodules of diamond-bonded carbon displaying characteristics similar to that of diamond"

A. Parties' Construction Arguments

The parties do not have any dispute about the meaning of the word "film," instead the issue is how to define "nanophase diamond." Both parties point to different portions of the specifications to support their proposed construction. Plaintiffs' proposed construction is the one determined by the Court in *Gillette.*

B. Analysis

To begin its analysis, the Court first turns to the language of the claims. The phrase "nanophase diamond film" appears in claims 1, 2, and 4 of the '797 patent and claims 1, 2, and 4 of the '650 patent. The phrase is used consistently in each patent and throughout the claims.

Moreover, the phrase is not explicitly defined in the claims. Thus, the Court turns to the specification.

The term "nanophase diamond" is expressly defined in the specification of the '797 patent. "*Vitrionics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) ("The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication.") Specifically, the specification states that "[t]he term 'nanophase diamond' refers to any type of structure having nanometer-scale nodules of diamond-bonded carbon displaying characteristics similar to that of diamond." '797 patent, 7:19-22.

Defendants argue that following portion of the specification further explains the term "nanophase diamond."

> This invention relates to an amorphous or ultra fine-grained, diamond-like material that is substantially free of graphite and hydrogen and is deposited in a film on a substrate in the form of nanometer-sized, tightly packed nodules of sp^3-bonded carbon, hereinafter referred to as 'nanophase diamond.'

'797 patent, 1:16-21. The Court finds that the passage of the specification relied on by Defendants is discussing a preferred embodiment of the invention and is not the explicit definition of the term. This embodiment of the invention should not be imported into the term's definition. Accordingly, the Court construes "nanophase diamond film" to mean "a film having nanometer-scale nodules of diamond-bonded carbon displaying characteristics similar." *Martek Biosciences Corp. v. Nutrinova, Inc.*, 579 F.3d 1363, 1380 (Fed. Cir. 2009) ("When a patentee explicitly defines a claim term in the patent specification, the patentee's definition controls.").

Defendants argue that the specification consistently defines "nanophase diamond" films as involving greater than 75% sp^3 bonded carbon and tightly packed "nodules" throughout the

film. Again, these are descriptions of the preferred embodiments of the invention that should not be read into the claims. In addition, the Court notes that the phrase "nanophase diamond films" appear in the preamble of the claims. It would be incorrect to read these preferred embodiments into the preamble of the claims. Indeed, the parties have agreed that "bonded predominately in three dimensional sp^3 bonds" means "approximately 95% or more of the bonds between the carbon atoms in each nodule are three dimensional sp^3 bonds." Thus, the limitation relating to the percentage of sp^3 bonds is explicitly included in the body of claim 1 and it would be incorrect to include Defendants' proposed limitation in the preamble of the claims.

Finally, Defendants contend that the one of ordinary skill in the art would not know which or how many characteristics of the film would need to be similar to characteristics of diamond to be covered by the claim. The Court disagrees. The specification identifies at least four "characteristics similar to that of diamond." '797 patent, 4:15-20 ("physical hardness, electrical strength, high thermal conductivity, and optical transparency"). Moreover, the specification provides numerical ranges for properties of both natural diamonds and nanophase diamond films. *See, e.g.*, '797 patent, 2:1-13; 15:15-64. In the light of the intrinsic evidence, the Court finds that a person of ordinary skilled would understand how a material can have characteristics similar to diamond without requiring numerical ranges. *See Exxon*, 265 F.3d at 1381 (Fed. Cir. 2001) ("[M]athematical precision is not required—only a reasonable degree of particularity and definiteness.") Accordingly, the Court construes "nanophase diamond film" as "a film having nanometer-scale packed nodules of diamond-bonded carbon displaying characteristics similar to that of diamond."

3. "an optical quality capable of providing a visual appearance of Newton's rings of interference"

Claim Term or Phrase	Plaintiffs' Proposed Construction	Defendants' Proposed Construction
"an optical quality capable of providing a visual appearance of Newton's rings of interference"	"Optical characteristics such that the material is capable of exhibiting visible dark, bright, and/or colored rings or lines."	Plaintiffs' proposed construction renders this term indefinite.

The Court construes "an optical quality capable of providing a visual appearance of Newton's rings of interference" as "optical characteristics such that the material is capable of exhibiting visible dark, bright, and/or colored rings or lines."

A. Parties' Construction Arguments

The parties' dispute whether the term "an optical quality capable of providing a visual appearance of Newton's rings of interference" is indefinite. Defendants contend that Plaintiffs' proposed construction renders the term indefinite because the claims fail to identify the required sample thickness needed to conduct the measurement. Plaintiffs' proposed construction is the one determined by the Court in *Gillette.*

B. Analysis

To begin its analysis, the Court first turns to the language of the claims. The phrases "an optical quality capable of providing a visual appearance of Newton's rings of interference" appears in claim 4 of the '797 patent. The Court finds that the phrase is used consistently in the patent and is meant to have a similar meaning. In addition, the phrase is not explicitly defined in the claims. Thus, the Court turns to the specification.

The specification of the '797 patent states:

> The optical quality of the nanophase diamond layer is particularly significant in that it is capable of providing a visual appearance of Newton's rings of interference. The occurrence of Newton's rings in a film of optical material can be an especially useful means for distinguishing that material from other so-called optical quality, or "diamond-like" materials. Properties of importance to the quality of an optical material include quantities such as a high index of refraction, a low coefficient for absorption of light, a smooth surface finish, and a nodule or crystal size smaller than a wavelength of the light of interest. Each of these properties is a necessary but not sufficient condition to support the appearance of Newtons' rings.

'797 patent, 12:51-61. The parties do not dispute that Newton's rings are understood by those of ordinary skill in the art to be a series of light, dark, and/or colored lines or rings created as results of interference patterns. (*See, e.g.*, Dkt. No. 288-1 at 90 (Eugene Hecht, Optics at 347).) Thus, the disputed claim term clearly refers to the nanophase diamond film having particular optical characteristics in which these visible dark, bright, and/or colored lines or rings are exhibited.

Defendants respond that there is not an issue of what Newton's rings look like. Instead, Defendants contend that whether a material will display the required optical quality depends on the form or shape of the material. That is, they contend that any material can have interference effects if it is sliced thin enough, including non-optical films such as metal films. Thus, it is not a term with any meaning or ability to carve out the scope of the claim. The Court disagrees because the specification explicitly states that materials capable of providing Newton's rings must have "a high index of refraction, a low coefficient for absorption of light, a smooth surface finish, and a nodule or crystal size smaller than a wavelength of the light of interest." *See, e.g.*, '797 patent, 12:56-59. As argued by Plaintiffs, the claims require an optical quality that would not be found in materials such as coal or metal, regardless of how thinly they are sliced. (*See*

Dkt. No 312-1 at ¶21.) Further, Claim 4 of the '797 patent requires only that the material be "*capable* of providing a visual appearance of Newton's rings of interference." Despite Defendants' contention, the claims do not require a specific thickness of the film as it relates to this element. Accordingly, the Court construes "an optical quality capable of providing a visual appearance of Newton's rings of interference" as "optical characteristics such that the material is capable of exhibiting visible dark, bright, and/or colored rings or lines."

4. "said film is chemically bonded with a substrate"

Claim Term or Phrase	Plaintiffs' Proposed Construction	Defendants' Proposed Construction
"said film is chemically bonded with a substrate"	"A chemical bond (i.e., the attractive force that holds together atoms in molecules and crystalline salts) is formed between at least a portion of the film and at least a portion of an adjacent, underlying material."	"A chemical compound consisting of carbon and an element of the substrate that chemically bonds the nanophase diamond film to the substrate."

The Court construes "said film is chemically bonded with a substrate" as "a chemical bond formed between a portion of the film and a portion of an adjacent, underlying material"

A. Parties' Construction Arguments

The parties dispute whether a film that is "chemically bonded" requires a "chemical compound consisting of carbon," as proposed by Defendants. Plaintiffs' proposed construction is the one determined by the Court in *Gillette.*

B. Analysis

To begin its analysis, the Court first turns to the language of the claims. The phrases "said film is chemically bonded with a substrate" appears in claim 1 of the '650 patent. The Court notes that the phrase is used consistently in each patent and is meant to have a similar

meaning. In addition, the phrase is not explicitly defined in the claims. Thus, the Court turns to the specification.

The specification teaches the use of chemical bonds between the claimed film and a portion of the substrate by stating "to hold the film onto the substrate [a] number of techniques might be considered, but one of the best is simply to chemically bond the coating to the material it covers in an interfacial layer." *See* '650 patent, 15:31-34. This "interfacial layer" represents the part of the film that chemically bonds with a portion of the substrate. *See id*. at 15:36-41. The substrate itself is also not limited by the specification, which even indicates that "the substrate is not necessarily a different material than the layer [of nanophase diamond film], but merely serves as a collection source for material." *See id*. 6:37-40.

Defendants argue that the specification "requires a chemical compound consisting of carbon and an element of the substrate." This language is not found anywhere in the specification of the '650 patent. Moreover, the only portions of the specification identified by Defendants to support their proposed construction are references to preferred embodiments. *See, e.g.*, '650 patent, 6:33-37, ("*may* include an interfacial layer," "[A] number of techniques might be considered, but *one of the best* is simply to chemically bond…"). Again, a preferred embodiment of the invention will not be read into the claim. After considering the submissions of counsel and the intrinsic record, the court is persuaded that Plaintiffs are correct. Neither the claim language nor the specification requires that carbon be a part of the chemical bond.

Unfortunately, the patent does not provide an explicit definition for the term "substrate," which is one of the terms in the disputed phrase. As indicated by the parties' proposed construction of the disputed phrase "bonded to a substrate with an alloyed layer," the parties

propose that "substrate" should be construed as "an adjacent, underlying material." Thus, the parties agree that one of ordinary skill in the art would interpret the term "substrate" as "an adjacent, underlying material." The Court finds that the parties' proposed construction is consistent with the specification and reflects the ordinary meaning of the term "substrate." *See, e.g.,* Hawley's Condensed Chemical Dictionary (1993). Accordingly, the Court construes "said film is chemically bonded with a substrate" as "a chemical bond formed between a portion of the film and a portion of an adjacent, underlying material."

5. "bonded to a substrate with an alloyed layer"

Claim Term or Phrase	Plaintiffs' Proposed Construction	Defendants' Proposed Construction
"bonded to a substrate with an alloyed layer"	"An adjacent, underlying material which includes a layer that is a mixture of a metal and one or more different metals or nonmetallic elements."	"An adjacent, underlying material which includes a layer that is bonded to the nanophase diamond film and that is a mixture of a metal and one or more different metals or nonmetallic elements."

The Court construes "bonded to a substrate with an alloyed layer" as "bonded to an adjacent, underlying material which includes a layer that is a mixture of a metal and one or more different metals or nonmetallic elements."

A. Parties' Construction Arguments

The parties dispute whether the "alloyed layer" has to make contact with the claimed film. Defendants contend that Plaintiffs' insistence on seeking to construe the phrase "substrate with an alloyed layer" rather than the un-truncated "bonded to a substrate with an alloyed layer" is telling because it is an apparent attempt to mask the fact that "with an alloyed layer" modifies the word "bonded" rather than "substrate." Plaintiffs' proposed construction is the one

determined by the Court in *Gillette.*

B. Analysis

To begin its analysis, the Court first turns to the language of the claims. The phrases "bonded to a substrate with an alloyed layer" appears in claim 2 of the '650 patent. Claim 1 recites ". . . wherein said film is chemically bonded with a substrate." Dependent claim 2 adds "wherein said film is bonded to a substrate with an alloyed layer." The language in claim 2 thus logically provides that the film is bonded with a substrate by way of an alloyed layer. "A dependent claim, by nature, incorporates all the limitations of the claim to which it refers." *Jeneric/ Pentron, Inc. v. Dillon Co., Inc.*, 205 F.3d 1377, 1383 (Fed. Cir. 2000) (citing 35 U.S.C. § 112, ¶ 4 (1994)). Although, Defendants correctly argue that the claims require the location of the bonding to between the film and an alloyed layer of the substrate, Defendants' proposed construction fails to capture that requirement. For example, if Defendants' proposed construction were inserted into the claim language in place of the disputed claim term, then the claimed nanophase diamond film would be bonded to a "material which includes a layer that is bonded to the nanophase diamond film." This would be redundant and repeat an express limitation already found in claim 2. When read in the context of the entire claim, Plaintiffs' proposed construction correctly captures the location of the bond.

The specification also recognizes that the bonding is performed by way of an alloyed layer. Specifically, the specification states:

> The existence of a chemical bond to the substrate depends on the material selected for the substrate. In some cases, it may not be possible for the nanophase diamond to form a chemical bond with the substrate. In that case, the film will be bonded to the substrate with an alloyed layer of a thickness between about 3 and 50 nm.

‘797 patent, 15:46-16:3. Thus, the explanation and purpose given in the specification is bonding the film to the substrate via an alloyed layer. To the extent that a party attempts to argue that the claims covers bonding the film directly to a substrate that has an alloyed layer on the opposite side, this argument would not be supported by the plain language of the claims.

Unfortunately, the patent does not provide an explicit definition for the term “substrate” and “alloy,” which are two of the terms in the disputed phrase. As discussed above, the Court construes “substrate” as “an adjacent, underlying material” as proposed by the parties. In addition, the parties propose that “alloy” should be construed as “a mixture of a metal and one or more different metals or nonmetallic elements.” Thus, the parties agree that one of ordinary skill in the art would interpret the term “alloy” as “a mixture of a metal and one or more different metals or nonmetallic elements.” The Court finds that the parties’ proposed construction is consistent with the specification and reflects the ordinary meanings of the terms “substrate” and “alloy.” *See, e.g.,* Hawley’s Condensed Chemical Dictionary (1993). Accordingly, the Court construes “bonded to a substrate with an alloyed layer” as “bonded to an adjacent, underlying material which includes a layer that is a mixture of a metal and one or more different metals or nonmetallic elements.”

VI. CONCLUSION

The Court adopts the constructions set forth in this opinion for the disputed terms and disputed phrases of the patents-in-suit. The parties are ordered that they may not refer, directly or indirectly, to each other’s claim construction positions in the presence of the jury. Likewise, the parties are ordered to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court, in the presence of the jury. Any reference to claim

construction proceedings is limited to informing the jury of the definitions adopted by the Court.

SIGNED this 22nd day of September, 2011.

T. JOHN WARD
UNITED STATES DISTRICT JUDGE