IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

WELLMAN, INC.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Civ. No. 07-585-SLR
	)	
EASTMAN CHEMICAL COMPANY,	)	
	)	
Defendant.	)	

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MEMORANDUM OPINION

Dated: February 2, 2010
Wilmington, Delaware

ROBINSON, District Judge

I. INTRODUCTION

Plaintiff Wellman, Inc. ("Wellman") is the owner of U.S. Patent No. 7,129,317 ("the '317 patent), entitled "Slow-Crystallizing Polyester Resins," which issued on October 31, 2006. Wellman also owns U.S. Patent No. 7,094,863 ("the '863 patent"), entitled "Polyester Preforms Useful for Enhanced Heat-Set Bottles," which issued on August 22, 2006.[1] Wellman has charged defendant Eastman Chemical Company ("Eastman") with infringing claims 1-5, 7, 8, 11-14, 16-21, 24, 32, 33, 36, 38, 39, 44, 93, 94, 96-102 and 104 of the '317 patent; of these, claims 1 and 93 are independent claims. Wellman also has asserted claims 1, 3-6, 8, 9, 11, 15, 17, 24 and 62 of the '863 patent against Eastman; of these, claims 1 and 15 are independent.

Pending before the court are the related issues of claim construction and indefiniteness, as well as Eastman's motion for summary judgment of invalidity for failure to satisfy the best mode requirement of 35 U.S.C. § 112, ¶ 1. The court has jurisdiction pursuant to 28 U.S.C. § 1338. For the reasons that follow, the court grants summary judgment that the Wellman patents are invalid for indefiniteness and, alternatively, for failing to set forth the best mode.

II. BACKGROUND

The subject matter of this case concerns plastic formulations, where even small changes in formulation can have dramatic consequences vis a vis multiple properties. (D.I. 264) The Wellman patents relate to high-quality polyethylene terephthalate

[1]Collectively, these two patents shall be referred to as "the Wellman patents."

("PET"), a polymer which lends itself to various commercial applications in the food and beverage packaging industry. The abstracts of both Wellman patents describe the invention disclosed therein as "relat[ing] to slow-crystallizing [PET] resins that possess a significantly higher heating crystallization exotherm peak temperature (T_{CH}) as compared with those of conventional antimony-catalyzed [PET] resins." According to the Wellman patents, having an "elevated heating crystallization exotherm temperature delays the onset of crystallization. All of the asserted independent claims disclose limitations related to T_{CH} and absorbance values; all but claim 93 of the '317 patent disclose a limitation related to luminosity (or "L*") values.[2]

The resins and preforms disclosed by the Wellman patents may be used to manufacture, inter alia, "hot-fill polyester bottles," "high-clarity polyester bottles suitable for carbonated drinks," and "fibers, yarns and fabrics." ('863 patent, col. 2:25-47; '317 patent, col. 2:17-36) Due to an elevated T_{CH}, "the [PET] resins of the present invention are especially useful for making hot-fill bottles having exceptional clarity and shrinkage properties." ('863 patent, col. 3:30-35; '317 patent, col. 3:20-25) "Hot-fill" manufactures can withstand exposure to high temperature products, an especially useful feature with respect to juice-based beverages, which require pasteurization by heating the beverage prior to bottling. Certain of the "hot-fill" products disclosed by the Wellman patents can receive liquids at temperatures upwards of 205° F. ('863 patent, col. 2:9-17; '317 patent, col. 2:1-9) Wellman has commercialized a "hot-fill" product, admittedly an

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[2]Eastman contends that these limitations are indefinite. Because these limitations are critical, the court will analyze the issue of indefiniteness within the context of its claim construction analysis, without addressing the many other claim construction issues.

embodiment of the Wellman patents, under the trade name Thermaclear® Ti818 ("Ti818").[3] (D.I. 105 at 7; D.I. 101 at 17)

III. STANDARD OF REVIEW

A. Claim Construction

Claim construction is a matter of law. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1330 (Fed. Cir. 2005) (en banc). Claim construction focuses on intrinsic evidence - the claims, specification and prosecution history - because intrinsic evidence is "the most significant source of the legally operative meaning of disputed claim language." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996); *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). Claims must be interpreted from the perspective of one of ordinary skill in the relevant art at the time of the invention. *Phillips*, 415 F.3d at 1313.

Claim construction starts with the claims, *id.* at 1312, and remains centered on the words of the claims throughout. *Interactive Gift Express, Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001). In the absence of an express intent to impart different meaning to claim terms, the terms are presumed to have their ordinary meaning. *Id.* Claims, however, must be read in view of the specification and prosecution history. Indeed, the specification is often "the single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315.

B. Summary Judgment

A court shall grant summary judgment only if "the pleadings, depositions,

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[3] *See gen.* *http://www.wellmaninc.com/ContentStore/PET/SellSheets/Ti818sheet.pdf.*

answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(c). The moving party bears the burden of proving that no genuine issue of material fact exists. *See Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 586 n.10 (1986). "Facts that could alter the outcome are 'material,' and disputes are 'genuine' if evidence exists from which a rational person could conclude that the position of the person with the burden of proof on the disputed issue is correct." *Horowitz v. Fed. Kemper Life Assurance Co.*, 57 F.3d 300, 302 n.1 (3d Cir. 1995) (internal citations omitted). If the moving party has demonstrated an absence of material fact, the nonmoving party then "must come forward with 'specific facts showing that there is a genuine issue for trial.'" *Matsushita*, 475 U.S. at 587 (quoting Fed. R. Civ. P. 56(e)). The court will "view the underlying facts and all reasonable inferences therefrom in the light most favorable to the party opposing the motion." *Pa. Coal Ass'n v. Babbitt*, 63 F.3d 231, 236 (3d Cir. 1995). The mere existence of some evidence in support of the nonmoving party, however, will not be sufficient for denial of a motion for summary judgment; there must be enough evidence to enable a jury reasonably to find for the nonmoving party on that issue. *See Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 249 (1986). If the nonmoving party fails to make a sufficient showing on an essential element of its case with respect to which it has the burden of proof, the moving party is entitled to judgment as a matter of law. *See Celotex Corp. v. Catrett*, 477 U.S. 317, 322 (1986).

IV. DISCUSSION

A. Best Mode

1. Facts relevant to best mode

Ti818 is a titanium-catalyzed PET. There is no dispute among the parties that, by 2004, Wellman had developed (and sold) Ti818. According to Dr. C. Steven Nichols ("Nichols"), a listed inventor of the Wellman patents and one of Wellman's experts, Ti818 had the following composition as of the filing date:[4]

Isophthalic Acid ("PIA")	1.4 mol. %
Diethylene Glycol ("DEG")	1.9 mol. %
Trimellitic Anhydride ("TMA")	500 ppm
Carbon-Black reheat agent	7.5 ppm
Elemental Cobalt	30 ppm
Titanium-based catalyst	7 ppm (Ti)
Phosphorus	5 ppm
Potassium	25 ppm

(D.I. 105 at 6) Ti818 (or this formula) is not disclosed in the Wellman patents *in toto*.[5]

a. N990

Ti818 employs a heat-up rate additive ("HUR") from the "carbon black" class. (D.I. 105 at 6) The carbon black HUR contained in Ti818 was specifically known as

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[4]Wellman argues in this regard that any recipe was "experimental" because the use of TMA branching agent and the level of carbon-black reheat agent were still being evaluated; additionally, no "unitary recipe . . . reflect[ed] the reality of PET manufacture," as quantities of additives may be varied somewhat during manufacture based on plant equipment. (D.I. 305 at 4, 10) The record contains no indication, however, that the original formula for Ti818 was ever altered.

[5]Indeed, Nichols admitted that the Wellman patents contain no explicit examples. (D.I. 283 at A0611) Dr. David A. Schiraldi ("Schiraldi") testified that "[t]he specific cookbook recipe as far as [Ti818] is not presented in the patent." (*Id.* at A0851) Both inventors Nichols and Tony Moore ("Moore") have acknowledged that the Wellman patents fail to explicitly disclose Ti818. (*Id.* at A0547, A0537)

N990 carbon black (or "N990"), and internally known at Wellman as "code 5056." (D.I. 283 at A0624) N990 has an optimum average particle size of 290 nm. (*Id.* at A0929) The Wellman patents disclose the use of carbon black, but state that the "most preferred [HURs]" are spinels. ('863 patent, col. 12:64-65; '317 patent, col. 11:43-44) Conversely, the Wellman patents characterize "carbon black" HURs as "[s]uitable." ('863 patent, col. 12:23-24; '317 patent, col. 11:1-2, 8-9) Notably, provisional application No. 60/472,309, from which the Wellman patents claim priority, contains the opposite disclosure, to wit, identifying carbon-based HURs as preferred and spinels as suitable.[6] (DTX 143)

With respect to the absence of any explicit disclosure of N990, inventor David Thompson ("Thompson") explained that his boss, James J. Bruening ("Bruening"), instructed him not to disclose N990 in the Wellman patents because Wellman sought to maintain N990 as a trade secret. (D.I. 283 at A0896, A0930) The absence of any explicit disclosure of N990 in the Wellman patents is corroborated by Bruening and Wellman's prosecuting attorney. (*Id.* at A0401, A0343)

The Wellman patents provide sparse detail with respect to the particle size of the HUR. The only explicit disclosure in the Wellman patents concerns a particle size of between "about 0.9 and 2.0 microns"[7] for tungsten-containing HURs. ('863 patent, col. 12:50-51; '317 patent, col. 11:28-29) Rather, the Wellman patents incorporate U.S.

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[6]Wellman alleges that this preference reversal stemmed from its concern of infringing U.S. Patent No. 6,503,586 to Wu ("the Wu patent"). (D.I. 304 at A1553)

[7]One micron equals 1000 nanometers, so the above range equates to 900 to 2000 nanometers.

Patent No. 4,408,004 ("Pengilly") by reference, noting that "satisfactory carbon black [HURs]" are disclosed therein. ('863 patent, col. 12:32-34; '317 patent, col. 11:10-12)

b. Other Ti818 components

The Ti818 formula contains 1.4 mole percent PIA and 1.9 mole percent DEG. (D.I. 105 at 6) TMA, present in the amount of 500 ppm, acts as the formula's branching agent. (*Id.*) The Ti818 formula further includes 25 ppm potassium, 5 ppm phosphorus, 30 ppm cobalt and 7 ppm titanium catalyst. (*Id.*)

The Wellman patents list a preferred range of PIA as between 1.6 and 2.4 mole percent, and the amount of DEG as 1.6 mole percent. ('863 patent, col. 22:30-34; '317 patent, col. 20:65-21:2) With respect to branching agents, the Wellman patents generally state a need for "less than about 2,000 ppm" of any branching agent. ('863 patent, col. 26:1-4; '317 patent, col. 24:37-40) The preferred branching agents are described as having from one to four "reactive sits available for branching." ('863 patent, col. 26:14-25; '317 patent, col. 24:49-59) TMA appears among a list of 13 additives described as "[a]cceptable chain branching agents," and then again in a list of 8 additives (and their "derivatives") described as "[p]referred aromatic chain branching agents. ('863 patent, col. 26:27-47; '317 patent, col. 24:60-25:1)

The Wellman patents also provide a list of solid state polymerization ("SSP") catalysts, noting that such catalysts are typically used in an amount "between about 10 and 70 ppm of the elemental metal." ('863 patent, col. 25:3-10; '317 patent, col. 23:38-46) The "[p]referred SSP catalysts include Group I and Group II metals." The Group I and Group II metals disclosed by the Wellman patents refer to the first two columns of the periodic table which are comprised of potassium as well as 11 other metallic

elements. With respect to phosphorus, the Wellman patents disclose a preferred range of between 2 and 10 ppm. ('863 patent, col. 20:6-11; '317 patent, col. 18:41-46) For titanium, the preferred range is between 5 and 15 ppm. (*Id.*) And for cobalt, the preferred range is between 20 and 30 ppm. ('863 patent, col. 11:29-30; '317 patent, col. 9:67-10:1)

2. Standard

The best mode requirement of 35 U.S.C. § 112, ¶ 1 states:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and **shall set forth the best mode contemplated by the inventor of carrying out his invention**.

35 U.S.C. § 112 (2002) (emphasis added).

"The purpose of the best mode requirement is to ensure that the public, in exchange for the rights given the inventor under the patent laws, obtains from the inventor a full disclosure of the preferred embodiment of the invention." *Dana Corp. v. IPC Ltd. P'ship*, 860 F.2d 415, 418 (Fed. Cir. 1988). Consequently, the best mode requirement of § 112 "requires an inventor to disclose the best mode contemplated by him, as of the time he executes the application, of carrying out the invention." *Bayer AG & Bayer Corp. v. Schein Pharms., Inc.*, 301 F.3d 1306, 1314 (Fed. Cir. 2002) (citation omitted).

In the case of patents with multiple inventors, "[b]est mode issues can arise if **any** inventor fails to disclose the best mode known to him or her." *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1351 n.5 (Fed. Cir. 1998) (emphasis added). "The existence of a best

mode is a purely subjective matter depending upon what the inventor actually believed at the time the application was filed." *Id.* Because of this subjectivity, § 112 demands actual disclosure, regardless of whether practicing that mode would be within the knowledge of one of ordinary skill in the art. *Id.* Nevertheless, the extent of this actual disclosure is limited to the invention as defined by the claims. *Id.* at 1315.

In determining whether an inventor has disclosed the best mode, the Federal Circuit has adopted a two-step inquiry. First, the invention must be defined by construing the claims. *Id.* at 1320 (citing *Northern Telecom Ltd. v. Samsung Elec. Co.*, 215 F.3d 1281, 1286-87 (Fed. Cir. 2000)). The Federal Circuit has noted in this regard that "[d]efinition of the invention 'is a legal exercise, wherein the ordinary principles of claim construction apply.'" *Id.* It has also commented that such definition "is a crucial predicate to the factual portions of the best mode inquiry because it ensures that the finder of fact looks only for preferences pertaining to carrying out the claimed invention." *Id.*

Once the claim analysis is complete, the finder of fact may proceed to the second step and determine whether, at the time of filing the application, the inventor possessed a best mode for practicing the claimed invention. *Id.* at 1320. If the inventor subjectively contemplated a best mode, then the fact-finder must evaluate whether the inventor's disclosure is objectively adequate to enable one of ordinary skill in the art to practice the best mode of the claimed invention. *Id.*

The Federal Circuit further has delineated that "if the best mode for carrying out the claimed invention involves novel subject matter, then an inventor must disclose a method for obtaining that subject matter even if it is unclaimed." *Id.* at 1322 (quoting *Eli*

Lilly & Co. v. Barr Labs., Inc., 251 F.3d 955, 965 (Fed. Cir. 2001)). In other words, when the subject matter is unclaimed, but both novel and essential for carrying out the best mode of the claimed invention, disclosure is required. *Id.* With regard to unclaimed subject matter unrelated to the properties of the claimed invention, the Federal Circuit has acknowledged that an inventor need not disclose a mode for obtaining it. *Id.* (citing *Eli Lilly*, 251 F.3d at 963).

3. Discussion

a. Ti818 is within the scope of the asserted claims

In response to Eastman's motion, Wellman generically asserts that claims 5, 17 and 94 of the '317 patent and claims 6 and 9 of the '863 patent do not encompass Ti818 because Ti818 has an absorbance (cm^{-1}) of 0.29 ('317 patent claims 5 & 94; '863 patent claim 6); a T_{CH} peak of 142 ('863 patent claim 9); and a T_{CC} peak of 184 ('317 patent claim 17). The evidentiary source of these values is the fourth Nichols declaration, belatedly produced by Wellman after the close of expert discovery.[8] Aside from its untimeliness, the court finds the fourth Nichols declaration especially troublesome insofar as Nichols has provided no supporting evidence for the proffered Ti818 data.[9] For both reasons, the court grants Eastman's motion to strike.

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[8]Nichols' second declaration states that Ti818 has an absorbance of 0.299 cm^{-1}. (D.I. 105 at 17) It appears that Wellman truncated the number to 0.29 cm^{-1} between the second and fourth declarations in an effort to remove Ti818 from the scope of the claims.

[9]There is no indication of how experiments were conducted, by whom on what date, on what apparatus, and to what (if any) degree of variability. The lack of any supporting information is especially significant insofar as Wellman has proposed very specific definitions for the claim terms at issue. Wellman argues that "T_{CH} is measured at a heating rate of 10 C per minute as measured by differential scanning calorimetry

It is necessary to note at this juncture that, outside of the fourth Nichols declaration, there is scant evidence regarding the properties of Ti818 of record. It was ultimately Eastman's burden on summary judgment to demonstrate that Ti818 (the allegedly withheld best mode) is encompassed by the asserted claims. Eastman has not provided its own data on Ti818. In its reply papers, Eastman relies on information contained in Nichols' (timely) second declaration, dated June 24, 2008.[10] These values are not as clear as Eastman suggests. Specifically, Nichols provided absorbance values (at the 1100 nm and 1280 nm wavelengths) of 0.299 cm^{-1} and 0.295 cm^{-1} for clear Ti818 plaques, but obtained nearly double those absorbance values when measuring hazy plaques. (D.I. 105 at 17) Nichols reported the T_{CH} peak for Ti818, taken on a "second scan," of 152.37 C. (*Id.* at 8) As discussed *infra*, the patents do not indicate whether the claimed T_{CH} values are obtained through a first or second scan.

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on a sample of amorphous PET material." (D.I. 335 at 3) Wellman asserts that "[a]n absorbance is measured at a wavelength of 1100 nm or at a wavelength of 1280 nm using a Foss 6500 Transport Analyzer [or comparable analyzer] on a standard ['i.e., having a surface finish representative of a preform (in other words, having an SPI surface finish bounded by A3 and B1)'] 3mm thick, clear non-crystalline polyester test plaque, wherein the raw data is normalized to 4.73 cm^{-1} at 2132 nm." (*Id.*) According to Wellman, a L* value is a value "in the CIE L*a*b* color space measured in a reflectance mode on crystalline resin pellets using a HunterLab Labscan XE [or comparable instrument]." (*Id.*) There is absolutely no indication that Wellman's expert conducted tests on Ti818 in the manner that Wellman asserts its patents require. All that appears in the declaration is a table of values – the same table that appears in Wellman's brief. (D.I. 304 at A1556, ¶ 27)

[10]In its opening papers, Eastman cites only Wellman's request for production, identifying Ti818 as a product "covered by one or more claims" of the Wellman patents, in support for its assertion that Ti818 is an embodiment of both patents. (D.I. 280 at 2 & n.1) The court is uncertain whether a party's request for documents could ever serve as an admission; this "statement," to the extent it is one, is still too broad to address the dependent claims.

The court is faced with a difficult situation. Eastman has not made a proffer demonstrating that Ti818 falls within the scope of the claims. Wellman, however, contests that only five dependant claims do not encompass Ti818. Without the stricken fourth Nichols declaration, Wellman has no evidence that Ti818 is not encompassed by these five claims. Further, the parties have not framed their best mode arguments as dependant in any way upon claim construction. If the court credited Wellman's position (with or without the stricken fourth Nichols declaration), the court would be required to construe the "about" limitation in order to determine whether Ti818 qualifies as a best mode of practicing all but one of these five dependant claims.[11]

With respect to the majority of asserted claims, the parties seek a determination of only whether Ti818 was a "best mode" for purposes of § 112, such that its non-disclosure renders the claims invalid. The court need not construe the claims (as it would normally do) in order to address this question. In view of the foregoing, the court declines to apply its findings to claims 5, 17, and 94 of the '317 patent and claims 6 and 9 of the '863 patent. Put most simply, Eastman has not met its burden on these claims.

b. At least one inventor considered Ti818 to be the best mode

As noted previously, "[b]est mode issues can arise if **any** inventor fails to disclose the best mode known to him or her." *Pannu*, 155 F.3d at 1351 n.5 (Fed. Cir. 1998) (emphasis added). Inventor Nichols testified at his deposition that Ti818 was the

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[11]Claims 5 and 94 of the '317 patent and claim 6 of the '863 patent require an absorbance of "at least **about** 0.30 cm^{-1}"; claim 9 of the '863 patent requires a heating crystallization exotherm peak temperature (T_{CH}) of between **about** 143°C and 153°C." In contrast, claim 17 of the '317 patent requires a "a cooling crystallization exotherm peak temperature (T_{CC}) of **less than** 180°C."

preferred PET recipe before May of 2004. (D.I. 283 at A0546, 0549) Nichols specifically stated that there were no other recipes better than Ti818 at that time. (*Id.* at A0549) Without specifically identifying Ti818, inventor Moore stated that as of May 2004, polymers using titanium-based catalyst and carbon black were made in the laboratory that represented the best way to achieve the claimed ranges. (*Id.* at A0457) Inventor Thompson generally agreed that Ti818 was the "leading titanium catalyst PET product at the time." (*Id.* at A0905)

Nichols explained his appreciation for the precise composition required to optimize resin properties as follows:

> What **we unlocked in our research was the secret** to making an effective slow-crystallizing bottle resin by understanding the **proper balance** of the parameters of **catalyst concentration**, **comonomer concentration**, intrinsic viscosity, and **[HUR]** in order to make high clarity bottles.

(D.I. 105 at 5) (emphasis added) With respect to this unlocked secret, Nichols declared an "appreciat[ion] that not any HUR of any size in any concentration was suitable." (*Id.*) Thompson, who tested various HURs, was so intrigued by the results of his test upon N990 that he initially sought to have it patented. (DX-126) (characterizing N990 as an "INVENTION") In his 2001 research memorandum analyzing particle size, Thompson wrote that N990 was "clearly the best" (*id.*), a sentiment reiterated during his deposition. (D.I. 283 at A0928) Wellman's internal testing documents display test results for various concentrations of N990 and note that 7.5 ppm was the "HUR needed for hot-fill." (DX-139)

Wellman has identified other components of Ti818 that work together in a synergistic manner or otherwise provide unexpected results over the prior art. (D.I. 238

at A0151-52) Schiraldi noted that by combining potassium with cobalt, Wellman's Ti818 avoided the undesirable yellowing experienced by prior art titanium catalyzed bottle PETs. (*Id.*) He also determined that Wellman's use of branching agents yielded unexpected results. Wellman's internal documents note that TMA, the branching agent of Ti818, solved the problematic "slow SSP rate." (DTX 48)

Wellman does not contest that inventors Nichols, Moore, and/or Thompson viewed Ti818 as the preferred embodiment. Wellman argues that the patents recite that tungsten-based heat up rate additives were preferred ('317 patent, col. 11:24-29; '863 patent, col. 12:46-51), in accordance with inventor Schiavone's view at the time. (D.I. 305 at 8, 21-22) Under *Pannu*, Schiavone's view does not excuse the other inventors' obligation to disclose their best mode. The court disagrees with Wellman that *Pannu* is not binding in this regard. There is no genuine dispute that at least one inventor regarded Ti818 as the best mode.[12]

c. The Wellman patents did not disclose the Ti818 formula such that a person of ordinary skill in the art could practice it

There is no disclosure of any PET resin formula in the Wellman patents. Instead, the Wellman patents disclose broad ranges of ingredients and concentrations, with some of these ranges identified as preferred, as follows:

[12]This is so even if no "precise" formula existed at the time. That certain minor modifications may have been made in manufacturing does not alter the fact that the (starting) recipe was preferred. Under Wellman's theory, no formula could ever be precise enough to represent a best mode of practicing a composition claim.

Isophthalic acid ("PIA")	1.4 mol %	1.5 mol %	figs. 1-4, 9; col. 8:7-22; col. 9:5-22	figs. 1-4, 9; col. 8:14-29; col. 9:15-30
		2.4 mol %	figs. 5-8, 9; col. 2:55-64; col. 4:34-45; col. 8:23-38; col. 9:5-22	figs. 5-8, 9; col. 2:65-col. 3:2; col. 4:42-52; col.8:30-45; col. 9:12-30
		1.6-2.4 mol% is "preferred"	col. 20:65-col. 21:2	col. 22:30-34
Diethylene glycol ("DEG")	1.9 mol %	1.6 mol %	figs. 1-8; col. 2:45-64; col. 4:39-44; col. 8:23-38; col. 9:5-22	figs. 1-8; col. 2:55-col. 3:2; col. 4:47-52; col. 8:30-45; col. 9:12-30
		1.6 mol % "preferred"	col. 20:65-col. 21:2	col. 22:30-34
Trimetallic anhydride ("TMA")	500 ppm	"less than about 2000 ppm" for any branching agent	col.24:37-40	col.26:1-4
Carbon-black reheat agent	7.5 ppm	**"most preferred" are spinels**	col. 11:43-59	col. 13:1-2; col. 12:64-65
		carbon-black is "suitable"	col. 11:1-12	col. 12:23-24, col. 12:32-34
Elemental cobalt	330 ppm	**15-40 ppm "preferred" for color; 20-30 ppm "most preferred"**	col. 11:27-31	col. 9:64:col. 10:1
Titanium-based catalyst	7 ppm (Ti)	not specified; 2-50 ppm elemental Ti preferred	col. 7:8-17	col. 7:1-10

Phosphorous	5 ppm	most preferrably between about 2-10 ppm	col. 18:38-46	col. 20:4-11
Potassium	25 ppm	"typically" "between about 10 and 70 ppm"	col.23:38-46	col. 25:3-10

In certain circumstances, the disclosure of ranges of ingredients encompassing the best mode has been held to satisfy the best mode requirement. *See Bard Peripheral Vascular, Inc. v. W.L. Gore & Associates, Inc.*, 586 F. Supp. 2d 1083, 1090 (D. Ariz. 2008) ("[T]he best mode requirement is satisfied when an inventor discloses a range that includes his best mode") (citing *Ernsthausen v. Nakayama*, 1 U.S.P.Q.2d 1539, 1549 (B.P.A.I. 1985)); *cf. Chemcast Corp. v. Arco Indus. Corp.*, 913 F.2d 923, 929 (Fed. Cir. 1990) (finding best mode was not disclosed by a general description of the material and a "Shore A" hardness range, in view of inventor's preference for one particular manufacturer's (tradenamed) material having a "Shore D" hardness of 75). In this case, the court finds the specification deficient vis a vis what at least one inventor knew to be the best mode, or Ti818.

There is no indication that a person of ordinary skill in the art could practice the preferred embodiment (or a formula equivalent to Ti818) using the Wellman patents' specifications. First, the specifications disclose a preferred range of PIA of 1.6-2.4 mol%. Ti818, having 1.4 mol% PIA, falls squarely outside of this range. Similarly, the patents disclose using DEG in the preferred quantity of 1.6 mol %; no other quantities are disclosed. Ti818 consists of 1.9 mol% DEG. Similarly, the specifications disclose that 20-30 ppm elemental cobalt is "most preferred," while Ti818 contains 330 ppm of that metal.

The patents also specifically state that the "most preferred" heat up rate additives are spinels. Two particular spinels, "copper chromite black spinel and chrome iron nickel black spinel," are exemplified as "particularly outstanding spinel pigments." Carbon black, the heat up additive **actually** preferred by (at least) inventor Thompson,[13] is described only as a "suitable" carbon-based heat up rate additive. Activated carbon and graphite are also listed as "suitable" additives.

For examples of such "satisfactory" carbon-black heat-up rate additives, the patents incorporate by reference Pengilly. Though Pengilly discloses and claims carbon black having an average particle size between 10-500 nm, Pengilly states that the "typical" particle size for such additives is "from about 10 to 100 nm," and the "preferred average particle size" is from about 15 to 30 nm. (Pengilly, col. 2:54-60; col. 4:18-24) As noted previously, carbon black N990 has a particle size of 290 nm. Thus, even if a person of ordinary skill in the art selected the "suitable" carbon black N990 over a "preferred" spinel, contrary to the teaching of the Wellman patents, he would be directed by Pengilly to additives having smaller particle sizes than that of carbon black N990. The Wellman patents, therefore, do not disclose the Ti818 formula because they do not provide appropriate levels of PIA, DEG and elemental cobalt, or disclose the preferred HUR.

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[13]In 2002, Thompson wrote that "carbon black with a 290 nm particle size [N990] had **clearly the best** reheat rate with the lowest [L*] and yellowness." (D.I. 283 at A1026 (emphasis added); *see also id.*, A0928 at 62:20-64:12) Carbon black, 290 nm was characterized as the "Invention" in a subsequent chart. (*Id.* at A1027) Eastman has also produced an email authored by inventor Moore containing a table characterizing "7.5 ppm code 5056" (or 7.5 ppm of N990) as the "HUR **Needed** for hotfill." (*Id.* at A1029, A1033) (emphasis added)

Based on the foregoing, the Wellman patents do not provide, either distinctly or through the disclosure of ranges, all of the components of Ti818 in the proper proportions. Indeed, the Wellman patents disclose no formulae for any of the claimed resins. Although the record reflects that Ti818 was Wellman's operative PET resin formula at the time its patents were filed, Ti818 was not described either by formula or tradename. The fact that it was Wellman's objective to keep a particular component of Ti818, carbon black N990, a trade secret (D.I. 283 at A0896, A0930, A0401, A0343) does not excuse Wellman's compliance with the best mode requirement. *See United States Gypsum Co. v. Nat'l Gypsum Co.*, 74 F.3d 1209, 1214 (citing *Chemcast Corp.v. Arco Indus. Corp.*, 913 F.2d 923, 930 (Fed. Cir. 1990)) (even trade secret formulae unknown to an inventor must be disclosed by, at a minimum, tradename and supplier information). Because at least inventor Nichols considered Ti818 to be the best mode at the time of filing, Wellman was obligated to disclose it in a sufficiently precise manner to enable one of ordinary skill in the art to identify it. *See id.* at 1214, fn.6. Its failure to do so renders the aforementioned claims of the '317 and '863 patents invalid.[14]

B. Indefiniteness

1. Standard

Indefiniteness is a question of law. *Amgen Inc. v. F. Hoffman-LA Roche Ltd.*, 580 F.3d 1340, 1371 (Fed. Cir. 2009) (citing *Praxair, Inc. v. ATMI, Inc.*, 543 F.3d 1306, 1319 (Fed. Cir. 2008)). That is, "[a] determination that a patent claim is invalid for

[14]The court notes that, in December 2009, Eastman filed a motion seeking a separate trial on Wellman's alleged inequitable conduct in failing to disclose Ti818 as its best mode. The court denies the motion as moot.

failure to meet the definiteness requirement of 35 U.S.C § 112 [¶ 2] is a legal conclusion that is drawn from the court's performance of its duty as the construer of patent claims[.]" *Biomedino, LLC v. Waters Technologies Corp.*, 490 F.3d 946, 949 (Fed. Cir. 2007) (citation omitted); *see also Exxon Research and Engineering Co. v. U.S.*, 265 F.3d 1371, 1376 (Fed. Cir. 2001) (rejecting argument that underlying questions of fact may preclude summary judgment on indefiniteness, as "a court may consider or reject certain extrinsic evidence in resolving disputes en route to pronouncing the meaning of claim language").

Section 112 requires that a patent "shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112, ¶ 2. As explained by the Federal Circuit,

> [t]he primary purpose of the definiteness requirement is to ensure that the claims are written in such a way that they give notice to the public of the extent of the legal protection afforded by the patent, so that interested members of the public, e.g., competitors of the patent owner, can determine whether or not they infringe.

All Dental Prodx, LLC v. Advantage Dental Prods., Inc., 309 F.3d 774, 779-80 (Fed. Cir. 2002) (*citing Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 28-29 (1997)). In other words,

> [a] patent holder should know what he owns, and the public should know what he does not. For this reason, the patent laws require inventors to describe their work in "full, clear, concise, and exact terms," 35 U.S.C. § 112, as part of the delicate balance the law attempts to maintain between inventors, who rely on the promise of the law to bring the invention forth, and the public, which should be encouraged to pursue innovations, creations, and new ideas beyond the inventor's exclusive rights.

Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 731 (2002).

A determination as to whether the definiteness requirement has been met "requires construction of the claims according to the familiar canons of claim construction." *All Dental Prodx, LLC v. Advantage Dental Prods.*, 309 F.3d at 779-80. Claims that are not amenable to construction or are insolubly ambiguous are indefinite. *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1249 (Fed. Cir. 2008). As with every construction issue, the focus of the indefiniteness inquiry is on the meaning that claim terms would have to one of ordinary skill in the art "at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips*, 415 F.3d at 1313 *(citing Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.,* 381 F.3d 1111, 1116 (Fed. Cir. 2004)).

Although a patentee need not define his invention with mathematical precision in order to comply with the definiteness requirement, *In re Marosi*, 710 F.2d 799, 802-03 (Fed. Cir. 1983), a claim is deemed sufficiently definite only if "one skilled in the art would understand the bounds of the claim when read in light of the specification." *Exxon Res. & Eng'g Co. v. U.S.*, 265 F.3d 1371, 1375 (Fed. Cir. 2001). Therefore, even if a claim term's definition can be reduced to words, it "is still indefinite if a person of ordinary skill in the art cannot translate the definition into meaningfully precise claim scope." *Halliburton*, 514 F.3d at 1251. In this regard, a claim term is indefinite if the patent does not provide an "objective anchor" or "yardstick against which potential infringers may measure their activities." *Girafa.com v. IAC Search & Media, Inc.*, Civ. No. 07-787-SLR, 2009 U.S. Dist. LEXIS 88796, at *7 (D. Del. Sept. 25, 2009).

In sum, the indefiniteness standard of 35 U.S.C. § 112, ¶ 2 is met "where an

accused infringer shows by clear and convincing evidence that a skilled artisan could not discern the boundaries of the claim based on the claim language, the specification, and the prosecution history, as well as her knowledge of the relevant art area." *Id.* Because both claim construction and indefiniteness are questions of law, these issues are amenable to summary judgment.

2. Discussion

All of the claims asserted by Wellman in this case[15] contain a limitation to a PET having a certain T_{CH}. The four independent claims are limited to a PET resin having a "heating crystallization exotherm peak temperature T_{CH} of more than about 140° C at a heating rate of 10° C per minute as measured by differential scanning calorimetry." (Claims 1 and 93 of the '317 patent; claims 1 and 15 of the '863 patent) In connection with the claim construction exercise, Wellman has proposed that this limitation be construed as follows: "T_{CH} is measured at a heating rate of 10° C per minute as measured by differential scanning calorimetry on a sample of amorphous PET material." Wellman finds support in the specification for its construction:

> The differential scanning calorimetry was performed by (1) holding a modified polyethylene terephthalate sample for one minute at 30 degrees Celsius; (2) heating the sample from 30 degrees Celsius to 280 degrees Celsius at 10 degrees Celsius per minute; (3) holding the sample at 280 degrees Celsius for two minutes; and (4) cooling the sample from 280 degrees to 30 degrees at 10 degrees Celsius per minute. FIGS. 1, 3, 5, and 7 correspond to the heating of amorphous polymer and FIGS. 2, 4, 6, and 8 correspond to the cooling of the same polymer from the melt phase.
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> * * * * * *

[15]Claims 2-60 and 76-104 of the '317 patent and claims 1-39, 47, 56-57 and 62-66 of the '863 patent.

> Accordingly, at a heating rate of 10° C. per minute as measured by differential scanning calorimetry, the polyethylene terephthalate resin has a heating crystallization exotherm peak temperature (T_{CH}) of more than about 140° C. and preferably more than about 142° C. (e.g., between 143° C. and 153° C.). Indeed, the polyethylene terephthalate resin can possess a crystallization exotherm peak temperature (T_{CH}) of 155° or more. Those having ordinary skill in the art will recognize that heating crystallization exotherm peak temperature (T_{CH}) is determined on a non-crystalline polyethylene terephthalate resin.

('317 patent, col. 7:64 - col. 8:6 and col. 8:48-58)

Eastman argues that the T_{CH} limitation is insolubly ambiguous because T_{CH} values depend on sample preparation and conditioning and the Wellman patents fail to specifically disclose such parameters. In the first instance, Eastman asserts that the T_{CH} of a PET sample will vary based on its thermal history.[16] There is no disclosure about thermal history in the Wellman patents.

Wellman's response to this assertion is convoluted at best. Wellman argues that a person of ordinary skill in the art would look to the "ISO standard of 1997" which teaches that, when preparing a specimen for DSC testing, "care shall be taken to prevent heating, polymer reorientation or any other effect that may alter the properties." (D.I. 303 at 8, citing D.I. 304 at A1316) According to Wellman, "[t]his fundamental principle was **known** to a person of ordinary skill in the art at the time the Wellman patents were filed. If the thermal history of a sample caused reorientation of the polymer, the DSC scan would become misshapen and possibly exhibit more than one exothermic peak[.]" (*Id.*) (emphasis in original) The ISO standard also provides,

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[16]Thermal history is the amount of heat and stress that a sample has been exposed to prior to the differential scanning calorimetry ("DSC") test, such as during manufacturing and specimen preparation. (D.I. 283 at A0218) The thermal history of a polymer is eliminated by a first scan. (*Id.*)

however, that a second scan is the preferred way of running a DSC test;[17] taking data from a first scan is a "deviation from the standard procedure." (D.I. 283, A0814 at 54:24-55:21)[18] The ISO standard further provides that such deviations should be done by "mutual agreement" between interested parties. (*Id.* at 56:1-58:14)

Despite the preference enunciated by the ISO standard, Wellman goes on to argue that its patents teach a "**four-step** protocol for conducting a '**first scan**' to determine the T_{CH} value;" "if Wellman's inventors had wanted a person of ordinary skill in the art to conduct a 'second scan' to evaluate the T_{CH} limitation of their claims, they would have provided a **six-step** protocol." (D.I. 303 at 10) (emphasis added) This argument also is inconsistent with the testimony of Wellman's inventors and expert during discovery, who could not discern from the intrinsic evidence whether the claimed T_{CH} was based on first or second scans. (D.I. 283, A0737 at 10:24-12:23; *id.* at A0817 at 66:25-67:13)[19]

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[17]In other words, because a first scan eliminates the thermal history of a polymer, it creates a common baseline for the comparison of each sample tested on a second scan.

[18]The ISO standard itself does not appear to be of record. Schiraldi read the relevant section into the record during his deposition.

[19]Perhaps in light of these inconsistencies, Wellman relies on a fourth declaration submitted by Schiraldi for the proposition that there is no significant difference between the results of a second scan DSC (which eliminates a polymer's thermal history) and a first scan DSC of an "amorphous enough" polymer (D.I. 304 at A0531-32, ¶ 21), when the first scan is "conducted at ambient temperature and typical PET moisture conditions." (D.I. 303 at 11) Like Nichols' fourth declaration, Schiraldi's fourth declaration is stricken for its untimely submission. Even if this evidence were properly before the court, Wellman's inventor testimony and internal documents contradict this argument. (D.I. 283, A0479 at 19:7-20:22; *id.*, A0825 at 101:15-23; DTX 34 (memorandum noting a 17° C difference between the two scans); *see also* D.I. 283, A0825 at 101:15-23)

Even were the court to accept Wellman's contention that its patents specify first scan DSC testing, Eastman argues that, "if two samples are conditioned differently, the T_{CH} value taken on a first DSC scan also will be different." (D.I. 278 at 10, citing D.I. 283, A0380-81 at 41:5-42:9) Along with its contentions regarding the effect of thermal history, Eastman asserts that variations in moisture content can also distort the T_{CH} value derived from a first scan. Wellman argues in response that "there are genuine issues of material fact in dispute as to whether the moisture content of PET resin has a pronounced effect on the T_{CH} values of a slow-crystallizing resin." (D.I. 303 at 7).

In support of its argument, Wellman cites to testing performed by Eastman's in-house technical expert, Dr. Quillen, wherein she tested two samples of the accused resin. One of the samples was moisture-conditioned at 25° C and 50% humidity for three hours prior to conducting the DSC test, and the other sample was tested without any moisture conditioning. The moisture-conditioned sample had a T_{CH} value of 130.99° C, while the sample without moisture conditioning had a T_{CH} value of 130.72° C. Wellman concludes that, under the "typical conditions for DSC testing,"[20] PET will only absorb 0.2 to 0.3 wt. % moisture, which amount "barely impacts DSC results." (D.I. 303 at 11) Extrinsic evidence submitted by Eastman suggests the opposite - that moisture can, in fact, affect the T_{CH} determined by a first scan DSC. (D.I. 283, A1341 ("[It is] beyond any doubt that absorbed water, even very low concentrations of absorbed water, dramatically accelerates the crystallization rate of PET."); *id.*, A1367-68 ("Absorbed moisture in PET has pronounced effects on the glass transition and

[20]That is, 25° C and 50% relative humidity, as described in the now-stricken Schiraldi fourth declaration. (D.I. 304, A1514 at ¶ 16)

crystallization temperatures."))

The Wellman patents do not disclose any conditions for DSC testing, let alone the conditions described by Wellman as "typical." Indeed, aside from the fact that these conditions are among those listed in Wellman's confidential, internal testing procedures (D.I. 328 at 7, citing D.I. 304 at A0775), there are no teachings in any non-confidential documents, prior art articles, or DSC guidelines that have been produced in this case.

The Federal Circuit, in *Honeywell Int'l, Inc. v. Int'l Trade Comm.*, 341 F.3d 1332 (Fed. Cir. 2003), has found indefiniteness under similar circumstances. In that case, the patent at issue defined a limitation, "MPE," as "the difference between the specimen melting point (M.P.) and the melting point (M.P.Q.) of a specimen after subsequent rapid liquid nitrogen quenching of an encapsulated [differential scanning calorimeter] sample from the melt." *Id.* at 1339. However, neither the claims, the written description, nor the prosecution history referenced any of the four known sample preparation methods that could be used to measure MPE. The Commission found, and Honeywell did not dispute, that "the choice of sample preparation method [was] critical to discerning whether a particular product" was made by an infringing process. *Id.*

Framed in terms of *Honeywell,* and irrespective of the ambiguity inherent in determining whether the Wellman patents suggest a first or second scan DSC, one of ordinary skill in the art seeking to determine whether the T_{CH} of a particular resin meets the T_{CH} limitation of (and thus infringes) the Wellman patents is faced with a multitude of choices. DSC testing may be performed pursuant to a second scan (with the thermal history erased by a previous scan) or according to a first scan (with the thermal history persisting). Moisture content creates similar issues. Even assuming that the

requirement of an amorphous sample is sufficiently evident from the specification, one skilled in the art must also divine whether the sample is "amorphous enough." Each of these parameters is crucial to providing the T_{CH} limitation with a fixed meaning.[21] The Wellman patents fail to disclose, or even direct one skilled in the art towards, the answers to these queries.

Assuming, arguendo, that Wellman has created a material fact dispute in this regard, the court remains unable to construe the T_{CH} limitation in a sufficiently definite way to aid the jury in its infringement analysis. The Federal Circuit has held that it is appropriate to render a patent invalid for indefiniteness even in the presence of an underlying factual dispute. *Exxon*, 265 F.3d at 1376. The *Exxon* court equated the determination of claim indefiniteness with the court's role in claim construction, noting in both cases that,

> although a court may consider or reject certain extrinsic evidence in resolving disputes en route to pronouncing the meaning of claim language, the court is not crediting certain evidence over other evidence or making factual evidentiary findings. Rather, the court is looking to the extrinsic evidence to assist in its construction of the written document . . . .

Id. (internal citations omitted). The absence of meaningful intrinsic guidance with respect to at least the variables described above results in a standard that is

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[21]Variation of any may result in the following undesirable circumstances: (1) a T_{CH} obtained pursuant to different conditions that provides a false positive for infringement (i.e., would not return an infringing T_{CH} if Wellman's conditions were observed); or (2) a T_{CH} obtained pursuant to different conditions that fails to identify infringement (i.e., would return an infringing T_{CH} if Wellman's conditions were observed).

speculative at best.[22] The extrinsic evidence relied upon does not ameliorate this deficiency. *See Honeywell*, 341 F.3d at 1340 (finding as insufficient expert testimony supportive of a construction untainted by indefiniteness when the intrinsic evidence failed to provide "guidance as to what one of ordinary skill in the art would interpret the claim to require."). Accordingly, the Wellman patents fail to define T_{CH} in a manner that allows one skilled in the art to "understand the bounds of the claim when read in light of the specification." *Exxon*, 265 F.3d at 1375.

V. CONCLUSION

For the foregoing reasons, the '317 and '863 patents are invalid for indefiniteness; asserted claims 1-4, 7, 8, 11-14, 16, 18-21, 24, 32, 33, 36, 38, 39, 44, 93, 96-102 and 104 of the '317 patent and 1, 3-5, 8, 11, 15, 17, 24 and 62 of the '863 patent are also invalid for failing to disclose the best mode.[23] An appropriate order shall issue.

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[22]Absent contemporary disclosures of the testing conditions, there is a danger as well of imposing post hoc requirements that were never contemplated by the inventors.

[23]The remaining pending motions are denied as moot.