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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARK BISCHOFF, MICHAEL KEMPE, MARKUS STREHLE, and WALTER WROBEL

Appeal 2019-002633
Application 11/988,399
Technology Center 3700

Before BRETT C. MARTIN, LISA M. GUIJT, and LEE L. STEPINA, *Administrative Patent Judges*.

GUIJT, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant[1] seeks our review under 35 U.S.C. § 134(a) of the final rejection of claims 27, 29, 30, 34, 35, and 56–62.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies Carl Zeiss Meditec AG as the real party in interest. Appeal Br. 2.

[2] Claims 1–26, 28, 31–33, and 36–55 are cancelled. Appeal Br. 37–39 (Claims App.).

THE INVENTION

Appellant's invention relates to "a device and a method for changing an optical and/or mechanical property of a lens implanted into an eye." Spec. 1:1–2. Claim 27, the sole independent claim on appeal, reproduced below, is illustrative of the subject matter on appeal.

> 27. A method for changing an optical and/or mechanical property of an intraocular lens implanted into an eye, said method comprising:
>
> measuring a deviation of at least one optical property of the implanted intraocular lens from a predetermined value;
>
> determining a required change of the optical property, the mechanical property or a combination of the foregoing of the implanted intraocular lens to reduce the measured deviation,
>
> applying pulsed laser radiation with a pulse duration of less than one picosecond to the implanted intraocular lens, said radiation being applied such that the required change of the optical and/or mechanical property is caused by nonlinear interaction between the pulsed laser radiation and the material of the implanted intraocular lens; and
>
> wherein a wavelength of the pulsed laser radiation is selected depending on the UV absorption edge of lens material of the implanted intraocular lens such that two photon or multiple photon absorption occurs in a material of the implanted intraocular lens.

THE REJECTIONS[3]

The Examiner relies upon the following as evidence in support of the rejections:

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[3] The following rejections are withdrawn by the Examiner: (i) claims 27, 29, 30, 34, 35, and 56–62 under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description regarding the claim limitations involving "infinite ranges," such as "a pulse duration of less than one picosecond" (Final Act. 7; Ans. 19); (ii) claims 27, 29, 30, 34, 35, and 56–62

NAME	REFERENCE	DATE
Lin	US 5,520,679	May 28, 1996
Bendett	US 2004/0243111 A1	Dec. 2, 2004
Bischoff '216[4]	WO 2005/058216 A1	June 30, 2005
Peyman	US 2005/0182489 A1	Aug. 18, 2005

The following rejections are before us for review:

I. Claims 27, 29, 30, 34, 35, and 56–62 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement regarding (i) the claim limitation "said radiation being applied such that the required change of the optical and/or mechanical property is caused by nonlinear interaction between the pulsed laser radiation and the material of the implanted intraocular lens" (Final Act. 7–9); and (ii) the claim limitation "wherein a wavelength of the pulsed laser radiation is selected depending on UV absorption edge of

under 35 U.S.C. § 112, first paragraph, for failing to comply with the enablement requirement regarding the claim limitations involving "infinite ranges" (Final Act. 10; Ans. 19); (iii) claims 27, 29, 30, 34, 35, and 56–62 under 35 U.S.C. § 112, second paragraph, as being indefinite regarding the claim limitation, "measuring a deviation of at least one optical property," and also "the passive claiming" of the claim limitation, "said radiation being applied such that . . . " (Final Act. 13; Ans. 20); (iv) claims 56 and 57 under 35 U.S.C. § 112, second paragraph, regarding "what is required in terms of active method steps to meet these claim limitations" (Final Act. 16; Ans. 20); (v) claim 60 under 35 U.S.C. § 112, second paragraph, as being indefinite, because "'[t]he wavelength' lacks antecedent basis" (Final Act. 17; Ans. 20); and (v) claims 58–62 under 35 U.S.C. § 112, second paragraph, as being indefinite, because of "passive claiming" (Final Act. 16; Ans. 20).

[4] We rely on the corresponding US publication of Bischoff '216, namely, Bischoff '443 (US 2008/0021443 A1; Jan. 24, 2008).

lens material of the implanted intraocular lens (IOL) such that two photon or multiple photon absorption occurs in a material of the implanted intraocular lens" (Final Act. 9–10) (emphasis omitted).

II. Claims 27, 29, 30, 34, 35, and 56–62 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement regarding the claim limitation "said radiation being applied such that the required change of the optical and/or mechanical property is caused by nonlinear interaction between the pulsed laser radiation and the material of the implanted intraocular lens." Final Act. 10–12.

III. Claims 27, 29, 30, 34, 35, and 56–62 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite: (i) for omitting essential steps (Final Act. 12–15); (ii) the claim limitation "wherein a wavelength of the pulsed laser radiation is selected depending on the UV absorption edge of lens material of the implanted intraocular lens such that two photon or multiple photon absorption occurs in a material of the implanted intraocular lens" is unclear because "the UV absorption edge of lens material" lacks antecedent basis and "it is unclear how the laser wavelength depends on the UV absorption edge" and "what wavelengths [are] encompass[ed]" (Final Act. 15); (iii) claim 58's recitation, "after an irradiating step is carried out" is unclear (Final Act. 16); (iv) regarding claim 59, "it is unclear if the residual deviation is actually

required to be measured" (Final Act. 17); and (v) regarding claim 61, "it is unclear what is required to produce no optical breakthroughs" (Final Act. 17).

IV. Claims 27, 29, 30, 34, 35, and 56–62 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Lin and Peyman.

V. Claims 27, 29, 30, 34, 35, and 56–62 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Bendett and Peyman.

VI. Claims 27, 29, 30, 34, 35, and 56–62 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Bischoff '443 and Peyman.

OPINION

Rejection I—Written Description

Claim 27: "said radiation being applied such that the required change of the optical and/or mechanical property is caused by nonlinear interaction between the pulsed laser radiation and the material of the implanted intraocular lens"

The Examiner finds, *inter alia*, that the referenced limitation lacks written description support because "merely reciting or contemplating a result of a method, does not prove that one has possession of method steps that accomplish the result." Final Act. 8 (citing MPEP § 2163.03). In particular, the Examiner finds that "[t]he only two parameters disclosed [by the Specification, for causing nonlinear action between the pulsed laser radiation and the IOL material] are wavelength and pulse duration," however, "many additional parameters must be known in order to achieve nonlinear interaction," for example, "color, thickness, density, and type of

tissue/material being treated, as well as wavelength, pulse duration, fluence, intensity, spot size, repetition rate, etc." Ans. 4; *see also id.* at 21. The Examiner relies on the Specification for implying that "the intensity and the focal point, i.e., spot size, of the laser, at the very least, must also be known in order to achieve non-linear interaction." *Id.* at 21.

Appellant argues that

> [a]s is known by those of skill in the art, nonlinear interaction occurs when two photon or multiphoton absorption occurs at a focal point of a laser applied to a material or tissue. The [S]pecification states, in part, that the laser radiation is preferably in the near infrared spectral region which is greater than 750 nm. In addition, the [S]pecification teaches that the radiation is provided in laser pulses with a pulse duration of less than 1 ps and in further examples, less than 500 femtoseconds or less than 100 femtoseconds. On pages 1-4 of the [Specification], Appellant explains with significant specificity how these circumstances are achieved. Accordingly, the [Specification] fully meets the written description requirement.

Appeal Br. 16. Appellant argues that the Examiner's findings are "without citation of evidence" and that "the Examiner has not met [the Examiner's] initial burden by presenting a preponderance of evidence why a person skilled in the art would not recognize in [Appellant's Specification] a description of the [claimed] invention." Reply Br. 4.

The PTO bears the initial burden of presenting a prima facie case of unpatentability. *In re Glaug*, 283 F.3d 1335, 1338 (Fed. Cir. 2002). The burden regarding the written description requirement is described in *In re Alton*, 76 F.3d 1168, 1175 (Fed. Cir. 1996) (parallel citations omitted):

> Insofar as the written description requirement is concerned, that burden is discharged by "presenting evidence or reasons why persons skilled in the art would not recognize in the disclosure a description of the invention defined by the claims." *Wertheim*,

> 541 F.2d at 263. . . . [If] the specification contains a description of the claimed invention, albeit not *in ipsis verbis* (in the identical words), then the examiner or Board, in order to meet the burden of proof, must provide reasons why one of ordinary skill in the art would not consider the description sufficient. *Id.* at 264. Once the examiner or Board carries the burden of making out a prima facie case of unpatentability, "the burden of coming forward with evidence or argument shifts to the applicant." *Oetiker*, 977 F.2d at 1445.

Notably, claims may fail to satisfy the written description requirement when the invention is claimed and described in functional language but the specification does not sufficiently identify how the invention achieves the claimed function. *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1349 (Fed. Cir. 2010) ("[A]n adequate written description of a claimed genus requires more than a generic statement of an invention's boundaries.") (citing *Regents of the University of California v. Eli Lilly & Co.*, 119 F.3d 1559, 1568 (Fed. Cir. 1997).

Regarding the Examiner's determination that claim 27 lacks written description support because the claim defines the invention in functional language specifying a desired result while the disclosure fails to sufficiently identify how the function is performed or the result is achieved, the Examiner characterizes the claimed result as a required change of the optical and/or mechanical properties caused by nonlinear interaction between the pulsed laser radiation and the material of the implanted intraocular lens. Therefore, we look to the Specification for written description support as to whether the inventors had possession of achieving such a change caused by nonlinear interaction between the pulsed radiation and IOL material.

The Specification discloses that

> control device 5, which controls the laser device 1 such that a non-linear optical interaction occurs at the focal points P1, P2. Now, the laser device 1 is controlled such that, due to the non-linear interaction at the points P1 and P2, the desired change of the optical and/or mechanical lens property occurs. The optical lens property may be, for example, the refractive index of the lens. The mechanical property of the lens may be, for example, its shaped and/or its rigidity or elasticity. The lens may consist of one single material or several materials. In particular, the lens may contain a material showing a structural change and/or a change in cross-linking due to the non-linear interaction.

Spec. 5:8–15.

The Specification also discloses that

> [t]he non-linear interaction between the laser radiation and the material of the lens allows the use of laser radiation having a *wavelength* which does not harm the cornea. Preferably, laser radiation in the *near-infrared spectral* region (greater than 750 nm) is used. The cornea and also the intraocular lens are transparent for *this wavelength* as long as only linear effects are taken into consideration. However, *two- or multiple-photon absorptions may occur which will then cause the desired change of the lens property*.
>
> In order to provide *the pulsed-laser radiation intensity* required *for the non-linear interaction*, it is preferred that the laser radiation source provide the laser pulses with *a pulse duration of less than 1 ps or less than 500 fs, in particular less than 100 fs.*
>
> In a preferred embodiment, the control device controls the laser device such that there is *a non-linear interaction*, but no optical breakthroughs. This is preferably *effected by controlling the radiation intensity*, *because as the intensity increases, multi-photon absorptions occur first, and then, if the power density of the radiation exceeds a threshold, an optical breakthrough occurs* at which a plasma bubble is produced in the material. Said plasma bubble grows due to expanding gases after forming the optical breakthrough. If the optical breakthrough is not maintained, the gas generated in the plasma bubble will be

> absorbed by the surrounding material and will disappear again. If a plasma is generated at a material interface which may even be located within a material structure, material removal is effected from said interface. This is then referred to as photoablation. In connection with a plasma bubble separating previously connected material layers, one usually speaks of photodisruption. For the sake of simplicity, all such processes are summarized here by the term optical breakthrough, i.e., this term includes not only the actual optical breakthrough, but also the effects resulting therefrom in the material.
>
> Now, if the laser device is controlled such that no optical breakthroughs appear, an extremely accurate and slight change in the lens properties is possible.
>
> In particular, *the imaging optics* comprise a deflecting unit by which the laser radiation can be focused in the lens and this *focal point (spot)* can be moved within the lens. By suitable local changes in the lens properties, the desired macroscopic modification of the lens property can be effected (for example, alteration of the refractive index, of the lens shape and/or of the elasticity of the lens). . . . Thus, the intraocular lens can be altered or structured, respectively, in three dimensions to set the desired lens property.

Spec. 1:26–2:25 (emphasis added).

The Specification also discloses that

> [t]he *intensity* required to cause the non-linear interaction which is not yet an optical breakthrough can be 10 to 100 times lower than the intensity required to produce optical breakthroughs. If a laser device is used by which optical breakthroughs are normally generated, *the lower required intensity may be used such that the laser radiation is deflected or scanned at a higher speed* so that the treatment duration can be considerably reduced or that *focusing is less strong* or that *several foci are generated* at the same time.
>
> Of course it is also possible to control the laser device using the control device such that optical breakthroughs occur.

Spec. 2:27–2:35 (emphasis added).

The Specification cautions that

> the required *photon density* for the non-linear interaction must not cause any harm to the eye. In order to reduce the photon density, imaging may be effected such that the implanted lens is not irradiated in its entirety, *but parts of the implanted lens are respectively irradiated* after one another and thus changed.

Spec. 3:4–8 (emphasis added).

The Specification further discloses that

> [i]rradiation can be effected such that, although a non-linear interaction occurs, there will be no optical breakthroughs. In this case, an extremely precise local change of a material property of the implanted lens is possible, allowing to realize the desired macroscopic change of the lens property.
>
> Of course, the method may also be carried out such that optical breakthroughs appear. In this case, the desired change of the lens property is achieved by the material removal occurring in the case of optical breakthroughs.

Spec. 3:29–37 (emphasis added); *see also* Spec. 2:3–8 (disclosing that *the power density* of the radiation determines whether an optical breakthrough occurs, which optical breakthrough results in "a plasma bubble . . . in the material," such that "photoablation" may occur). The Specification discloses that "optical breakthroughs can be produced such that one or more layers of gas bubbles are generated which diffuse outward and, thus, disappear from the implanted lens, thereby causing a change in the shape of the implanted lens." Spec. 4:7–9.

Thus, the Specification discloses that nonlinear interaction between the pulsed laser radiation and IOL material is achieved by controlling *radiation intensity*, such that two- or multiple-photon absorptions occur to cause the desired change of the lens property, which may or may not result in optical breakthroughs—either of which achieves changes in the optical

and/or mechanical properties of the lens. *See also* Bischoff '443 ¶¶ 2, 3. The Specification specifies selecting a wavelength (i.e., a wavelength which does not harm the cornea, and preferably, in the near-infrared spectral region of greater than 750 nm) and pulse duration (i.e., less than 1 ps or less than 500 fs, or more particularly, less than 100 fs). The Specification also discloses that scanning speed, focusing strength, number of foci, and radiating parts of the lens affect radiation intensity.

We determine that a preponderance of the evidence supports the Examiner's finding that parameters *in addition to* wavelength and pulse duration are required to be specified to produce a radiation intensity that results in a nonlinear interaction between the pulsed laser radiation and IOL material (which Appellant submits occurs when two photon or multiphoton absorption occurs at a focal point of a laser applied to a material), because Appellant's Specification itself recognizes that radiation intensity, which achieves such nonlinear interaction, may be controlled by scanning speed, focusing strength, number of foci, and radiating parts of the lens. *See, e.g.*, Spec. 2:27–32.

Further, Lin, for example, evidences that laser intensity is dependent on laser energy per pulse and the area on which the beam is focused ("I=E/A"). Lin 6:41–43. Lin discloses using an "ultrashort pulsed laser[]," such as a "Ti:sapphire laser," as disclosed in the Specification, including a more complete listing of radiation intensity parameters to determine an "ablation threshold": "wavelength ranges of (750–1100 nm), repetition rates of (0.01–100 MHz), energy per pulse of (0.01–100) micro-joules, and pulse durations of (0.05–10) picoseconds." *Id.* at 9:10–17. Lin also recognizes that scanning speed is critical to achieve tissue ablation: "[w]ithout a

scanning device, an ultrashort pulsed laser cannot be used in refractive surgery due to its energy level of less than 0.1 mJ and spot size smaller than 0.5 mm." *Id.* at 9:22–30. In other words, the Examiner provides reasons why one of ordinary skill in the art would not consider the description sufficient due to the missing parameters required to establish a radiation intensity necessary to achieve the claimed result.

Still further, Bendett also evidences that such *additional* parameters must be known for photodisruption of the IOL—to destroy the cohesion of a material (including "intraocular lenses (IOL)" (Bendett ¶ 24)) by forming a cavitation bubble (*id.* ¶ 5), such that "places in the material . . . are modified by the laser focus during the short pulse duration" (*id.* ¶ 27). *See also* Bendett ¶ 28 ("the ultrashort laser pulses which are focused on a focus diameter on the order of magnitude of 3 μm can undo the material coherence and/or bring about structural changes in the material in a small, precise cavitation bubble without thermal, acoustic or mechanical loading of adjacent areas in the material"); ¶ 32 ("[t]he beam focusing device serves to cancel the coherence of the material (photodisruption) in the focus of the beam on or in the material," which "is generally accomplished by local vaporization of the material"); ¶ 37 ("[b]ecause of the high repetition rates . . . in conjunction with the low pulse energies and the deflection devices . . . , the laser action for the *photodisruption* can be precisely localized") (emphasis added). In sum, Bendett discloses that "[o]ne laser pulse with defined pulse parameters (pulse energy, pulse duration, focus) is generally sufficient to produce a spot in which the material structure is dissolved." Bendett ¶ 38; ¶ 67 (discussing the destruction of material by "a sharply focused femtosecond laser"). Regarding additional parameters, Bendett

discloses, for example, "a pulsed laser beam with a pulse energy of less than 5 μj is focused on a focus diameter of a few micrometers" at "a pulse repetition rate of greater than 50kHz" to generate cavitation bubble. *Id.* ¶ 11. *See also id.* ¶ 13 (disclosing an embodiment with pulsed laser parameters including beam energy, repetition rate, beam focus diameter, as well as an ultrashort pulse duration of "preferably about 100 fs to 1 ps"); ¶ 21 (disclosing *sapphire* doped laser media); ¶ 22 (disclosing titanium doped host materials "characterized by a spectrally broadband laser emission in the spectral range of 600 nm to 2000 nm" and "comprehend[ing] the spectral region between 800 nm and 1200 nm which is particularly suitable for refractive cornea surgery"); *cf.* Spec. 4:30 (disclosing the use of a "TiSa laser").

Thus, we determine that the Examiner has established a prima facie case of unpatentability by presenting reasons why persons skilled in the art would not recognize in the Specification a description of the invention as claimed. In other words, the Examiner has sufficiently supported the finding that, by disclosing only a few of the many parameters required to be known to affect radiation intensity, and therefore, cause a nonlinear interaction between a pulsed laser radiation and IOL material, the Specification does not sufficiently identify how the invention achieves the claimed function such that one may conclude Applicant was in possession of the invention as broadly claimed.

Critically, Appellant does not point us to any specific evidence—in the Specification or otherwise—that parameters necessary to achieve a laser intensity for causing nonlinear interaction between the pulsed laser radiation and the IOL material, as claimed, *in addition to* wavelength and pulse

duration, are either disclosed in the Specification or within the knowledge of a person of ordinary skill in the art, such that we may conclude that Appellant had possession of the claimed invention. Rather, Appellant merely provides the attorney argument set forth *supra* that the Specification provides support and meets the written description requirement. *See* Appeal Br. 15; Reply Br. 4; *Estee Lauder, Inc. v. L'Oreal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997) (holding that attorney argument cannot take the place of evidence in the record).

Accordingly, on the record before us, we sustain the Examiner's rejection of claim 27 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement, regarding the claim limitation "said radiation being applied such that the required change of the optical and/or mechanical property is caused by nonlinear interaction between the pulsed laser radiation and the material of the implanted intraocular lens." Appellant chose not to present separate arguments for the patentability of the dependent claims pursuant to this rejection, and therefore, we also sustain the Examiner's rejection of claims 29, 30, 34, 35, and 56–62, which depend from claim 27. Appeal Br. 16.

Claim 27: "wherein a wavelength of the pulsed laser radiation is selected depending on UV absorption edge of lens material of the implanted intraocular lens such that two photon or multiple photon absorption occurs in a material of the implanted intraocular lens"

Similar to the claim limitation discussed *supra*, the Examiner finds that claim 27 fails to satisfy the written description requirement because the invention is claimed and described in functional language, but the Specification does not sufficiently identify how the invention achieves the

claimed function, because the Specification only discloses a few of the many parameters that affect the result. Final Act. 21–22.[5]

Appellant argues that the Specification "discusses selecting a wavelength based on an absorption edge," and that

> [t]here is no legal requirement for anything more. . . . As is apparent from the written description the wavelength of which this occurs will vary depending upon the material of the intraocular lens implant. These wavelengths can be determined without undue experimentation by reference to the literature or by spectroscopic study. Accordingly, this claim limitation is fully supported by written description and the Examiner does not establish a *prima face* case of lack of written description.

Appeal Br. 18–19; *see, e.g.*, Spec. 5:17–23.

Similar to the claim limitation discussed *supra*, we determine that the Examiner has stated a prima facie case of a failure of claim 27 to comply with the written description requirement, *not* because there is a question as to whether there is written description support for knowing how to select a wavelength based on the UV absorption edge of lens material, but rather, for essentially the same reason discussed *supra*: the Examiner presents a reason why persons skilled in the art would not recognize in the Specification a description of the invention as claimed in that, by only disclosing a few of the parameters (i.e., wavelength and pulse duration) affecting photon absorption in an IOL material (i.e., to photon or multiple photon absorption and thus, nonlinear interaction between the pulsed laser radiation and IOL

[5] Notably, the Examiner accepts Appellant's submission that "UV absorption edge," as claimed, is a term known in the art. Ans. 23; *see also e.g.*, Appeal Br. 8 ("[t]he definition of UV absorption edge is known to those of ordinary skill in the art and is readily accessible from references such as Wikipedia and the Penguin Dictionary of Physics"); Reply Br. 4–5, 8 ("[t]his information can be sought and found through research").

material), the Specification does not sufficiently identify how the invention achieves the claimed function such that one may conclude Applicant was in possession of the invention as broadly claimed, without additional evidence from Appellant regarding knowledge of a person of ordinary skill in the art. Appellant's arguments do not address the Examiner's rejection.

Accordingly, on the record before us, we sustain the Examiner's rejection of claim 27 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement, regarding the claim limitation "wherein a wavelength of the pulsed laser radiation is selected depending on UV absorption edge of lens material of the implanted intraocular lens such that two photon or multiple photon absorption occurs in a material of the implanted intraocular lens." Appellant chose not to present separate arguments for the patentability of the dependent claims pursuant to this rejection, and therefore, we also sustain the Examiner's rejection of claims 29, 30, 34, 35, and 56–62, which depend from claim 27. Appeal Br. 16–19.

Rejection II—Enablement

Regarding independent claim 27, the Examiner finds that the limitation requiring application of pulsed laser radiation with a pulse duration of less than one picosecond to the IOL to be applied such that the required change of the optical and/or mechanical property is caused by nonlinear interaction between the pulsed laser radiation and the material of the IOL "would take undue experimentation," because of "the complex nature of laser eye surgery and other prior art disclosures which explain the laser parameters in extensive detail." Final Act. 10. For example, the Examiner finds that "[laser] intensity (W/cm^2)" affects whether nonlinear

interaction occurs, and that laser intensity "relies on three other parameters, specifically power (Joules), pulse duration (seconds) and spot size (cm^2)"—and further, that of these parameters only pulse duration is disclosed in the Specification. *Id.* at 11. In sum, the Examiner finds that "undue experimentation is required in order to figure out all the parameters (wavelength, pulse duration, power, spot size, repetition rate, etc) for all the different types of materials . . . that result in the claimed effect." *Id.*

Appellant argues that "the Examiner has not analyzed or addressed all of the . . . Wands Factors," and therefore, "the Examiner has not established a *prima facie* case of lack of enablement," for example, the Examiner has not addressed "the level of predictability in the art, the level of ordinary skill in the art or the quantity of experimentation required in other than a conclusory fashion." Appeal Br. 20; Reply Br. 6. Appellant submits that "Appellant has provided considerable guidance and direction to one of ordinary skill in the art to practice the invention in the [Specification] as explained in the amendments and [discussed in the Appeal Brief]." Appeal Br. 20. Appellant concludes that Appellant "has provided examples and explanations as to how one of ordinary skill in the art would be able to determine the required information without undue experimentation in prior responses." *Id.* at 21.

The Examiner responds that "[t]here is no legal requirement that each and every one of the Wands factors must be explicitly addressed in the rejection," and maintains that all of the *Wands* factors were addressed "expressly or implicitly." Ans. 23–24.

The dispositive issue is whether Appellant's disclosure, considering the level of ordinary skill in the art as of the date of the application, would

have enabled a person of such skill to make and use the claimed invention without undue experimentation. *In re Strahilevitz*, 668 F.2d 1229, 1232 (CCPA 1982). Some factors to be considered in determining whether a disclosure would require undue experimentation include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

Regarding the facts set forth in *Wands*, here, the Examiner finds *supra* that the quantity of experimentation necessary is great given the number of parameters affecting radiation intensity and IOL material. *See, e.g.*, Final Act. 11 (finding that "there are an exponential amount of combinations that would have to be attempted by trial and error to see which ones result in a non-linear reaction and change in refractive index"). The Examiner also finds that the amount of direction presented in the Specification is insufficient because only two of the many parameters affecting radiation intensity are disclosed , namely, pulse duration and wavelength, as discussed *supra*. Although the Examiner does not expressly address the presence or absence of working examples, the Examiner implies that the Specification lacks an example that discloses *all* of the parameters necessary to result in a radiation intensity that achieves the claimed result. The Examiner finds *supra* that the state of the prior art is "complex" and implies that the relative skill of those in the art is demonstrated by the prior art references. The Examiner does not expressly address the predictability of the art, however, the Examiner implicitly finds that a person of skill in the art would be unable

to predict whether the claimed parameters achieve the claimed results without undue experimentation. The Examiner finds *supra* that the claims are broad, for example, claiming a function or result.

Appellant does not provide us with any specific evidence to support the conclusory statement that "considerable guidance and direction to one of ordinary skill in the art to practice the invention" is in the Specification or amendments of record, as argued *supra*.

Accordingly, on the record before us, we sustain the Examiner's rejection of claim 27 as failing to comply with the enablement requirement. Appellant chose not to present separate arguments for the patentability of the dependent claims pursuant to this rejection, and therefore, we also sustain the Examiner's rejection of claims 29, 30, 34, 35, and 56–62, which depend from claim 27. Appeal Br. 19–21.

Rejection III—Indefiniteness

Claim 27: Omitting essential steps

The Examiner finds that "if a reference teaches the wavelength and pulse duration as disclosed/claimed," the reference "inherently results in the claimed effects," and if Appellant disagrees, "then clearly the claims are missing essential steps, i.e. parameters required to perform the method." Final Act. 12. In other words, the Examiner finds that Appellant "is required to positively claim all of the parameters that result in the claimed effect." *Id.*

Appellant argues that "Appellant does not state in the application or in the prosecution history of the application any essential steps," and that "[t]he allegedly omitted essential steps are stated to be 'the specific steps, i.e. laser parameters that cause the recited effects.'" Appeal Br. 22. Appellant

submits that "[t]o be an essential element of the invention a claim element must be specified in the patent specification or in the file history of the application as an essential element by the inventor." Reply Br. 7 (citing *In re Mayhew*, 527 F.2d 1229 (CCPA 1976). Appellant concludes that Appellant "has provided ample information to one of ordinary skill in the art to practice the invention." Appeal Br. 22.

MPEP § 2172.01 states that "essential matter may include missing elements . . . *described by applicant*(*s*) *as necessary* to practice the invention . . . [and] a claim which fails to interrelate *essential elements of the invention as defined by applicant*(*s*) *in the specification* may be rejected" under 35 U.S.C. § 112, second paragraph, as indefinite. *Id.* (emphasis added).

The Specification discloses that "[i]n order to provide the pulsed-laser *radiation intensity* required for the non-liner interaction, it is preferred that the laser radiation source provide the laser pulses with a pulse duration of less than 1 ps or less than 500 fs, in particular less than 100 fs." Spec. 1:33–35 (emphasis added); *see also id.* at 1:38–2:3 (disclosing that radiation intensity is determinative of multi-photon absorptions), 3:25–27 ("[t]he use of such pulses allows to achieve the required intensity for the non-linear interaction"). Thus, a preponderance of the evidence supports the Examiner's finding that *radiation intensity* is a parameter that is specified in the Specification *as essential* for achieving the claimed result. Appellant's argument does not apprise us of error in the Examiner's finding.

Accordingly, on the record before us, we sustain the Examiner's rejection of claim 27 as indefinite for omitting essential elements. Appellant chose not to present separate arguments for the patentability of the dependent claims pursuant to this rejection, and therefore, we also sustain

the Examiner's rejection of claims 29, 30, 34, 35, and 56–62, which depend from claim 27. Appeal Br. 22.

Claim 27: "absorption edge of lens materials"

Regarding independent claim 27, the Examiner finds that the claim limitation "wherein a wavelength of the pulsed laser radiation is selected depending on the UV absorption edge of lens material of the implanted intraocular lens such that two photon or multiple photon absorption occurs in a material of the implanted intraocular lens" is unclear because "the UV absorption edge of lens material" lacks antecedent basis. Further, the Examiner determines it is unclear "how the laser wavelength depends on the UV absorption edge" and "what wavelengths [are] encompass[ed]." Final Act. 15.

Appellant admits that the claim term "UV absorption edge of lens material" may lack antecedent basis. Appeal Br. 25. Appellant also refers the Examiner to the meaning of the term "UV absorption edge," which Appellant submits is "known to those skilled in the art." *Id.*

We find that to the extent "UV absorption edge" is a term of art, or a known single value of an IOL material, antecedent basis may be implied. We also find that because claim 27 specifies that the wavelength is selected such that two photon or multiple photon absorption occurs in the IOL material, claim 27 implies that the wavelength is selected depending on the UV absorption edge to achieve this result, which Appellant represents is also a known value. *See, e.g.*, Appeal Br. 8 (disclosing that "[a]n absorption edge . . . is a sharp discontinuity in the absorption spectrum of a substance" and that "[t]hese discontinuities occur at wavelength where the energy of an

absorbed photon corresponds to an electronic transition or ionization potential"); *id.* at 18–19 (submitting that the exact wavelength where discontinuity occurs may be determined "by reference to the literature").

Accordingly, we do not sustain the Examiner's rejection of claims 29, 30, 34, 35, and 56–62 on this basis.

Claim 58: Claim limitation "after an irradiating step is carried out"

Claim 58 depends from independent claim 27 and recites, in relevant part, "wherein a residual deviation of at least one optical property of the implanted intraocular lens from the predetermined value is measured after an irradiating step is carried out in which the pulsed laser radiation is applied to the implanted intraocular lens." Appeal Br. 39 (Claims App.). The Examiner finds that it is unclear whether the recited "irradiating step" is the "applying pulsed laser radiation" step recited in claim 27.

Appellant argues that "[t]his language clearly indicates that residual deviation of at least one optical property is measured after an irradiating step is carried out." Appeal Br. 27.

We find claim 58 sufficiently clear, whether or not the irradiation step recited in claim 58 is the step of applying pulsed laser radiation according to claim 27. In other words, claim 58 is not indefinite, but simply broad, and "breadth is not to be equated with indefiniteness." *In re Miller*, 441 F.2d 689, 693 (CCPA 1971).

Accordingly, we do not sustain the Examiner's rejection of claims 29, 30, 34, 35, and 56–62 on this basis.

Claim 59: Is measurement of residual deviation required?

Claim 59 depends from claim 39, which has been cancelled.[6] Appeal Br. 38, 39 (Claims App.). Because claim 59 recites, in relevant part, "wherein applying the pulsed laser radiation is carried out depending on the measured residual deviation," claim 59 appears to be intended as depending from claim 58, which provides antecedent basis for measuring the residual deviation.

The Examiner finds that "it is unclear if the residual deviation is actually required to be measured," and "it is therefore unclear how applying pulsed laser radiation can [be] based on something that isn't required to happen." Final Act. 17.

Here, the antecedent basis for the step of "applying pulsed laser radiation," as recited in claim 27, is apparently based on the measured residual deviation, which occurs *after* the steps of claim 27. Therefore, notwithstanding the incorrect dependency of claim 59 on cancelled claim 39, we agree with the Examiner that substantively, with respect to order of steps, claim 59 is indefinite.

Accordingly, we sustain the Examiner's rejection of claim 59 on this basis.

Claim 61: *What is required to produce no optical breakthroughs?*

Claim 61 depends from independent claim 27 and recites, in relevant

[6] Appellant submits that "[u]pon indication that claim 39 is otherwise allowable based on the arguments in this Appeal Brief, Appellant will approve an Examiner's Amendment to correct the dependency of claim 59." Appeal Br. 35.

part, "wherein the pulsed laser radiation is applied such that no optical breakthroughs appear in the lens material." Appeal Br. 39 (Claims App.).

The Examiner finds that "it is unclear what is required to produce no optical breakthroughs; are additional steps required or is this an inherent result of the previous method steps?" Final Act. 17.

Appellant refers to the Specification's explanation that "controlling the radiation intensity determines whether optical breakthroughs will occur." Appeal Br. 29 (citing Spec. 1:36–2:11). Appellant concludes that "it is clear to one of ordinary skill in the art that applying laser radiation below a threshold value will cause multiphoton absorption to occur without the creation of an optical breakthrough." *Id.* at 29–30.

We are persuaded by Appellant's argument, in that the Specification discloses that radiation intensity, which is applied by the pulsed laser, may be controlled to limit optical breakthroughs in the IOL material. In other words, *the meaning* of claim 61 is clear.

Accordingly, we do not sustain the Examiner's rejection of claim 61 on this basis.

Rejection IV

Claims 27, 29, 30, 34, 35, and 56–62: unpatentable over Lin and Peyman

Regarding independent claim 27, the Examiner finds that Lin discloses a laser eye surgery method for correcting artificial lenses (or intraocular lenses or IOLs), "using a Ti:sapphire laser with wavelengths ranging from ***750 nm to 100 nm*** and applying ultra-short pulsed laser pulses with pulse durations ranging from ***50 femtoseconds to 10 picoseconds***" and also "a power level ranging from ***10 nanoJoules to 100 microjoules***." Final

Act. 19; *see, e.g.*, Lin 9:10–22; *see also* Spec. 3:22–23 (disclosing that "a wavelength in the near-infrared range" is, for example, "greater than 750 nm"); Lin 5:36–40. The Examiner determines that "using the smallest power level, highest pulse rate, and largest spot size would produce the required intensity that *necessarily* achieves the claimed results." *Id.* (emphasis added). The Examiner relies on Peyman for disclosing "a method of changing the visual acuity of a patient by applying laser *pulses to an [intraocular lens (IOL)] while the IOL is implanted into a patient's eye*," and the Examiner reasons that it would have been obvious "to perform the method of Lin on an IOL, after the IOL has already been implanted into the eye, as taught by Peyman." *Id.* at 20 (*citing* Peyman ¶ 25, Fig. 1 (reference numeral, or IOL, 12)) (emphasis added). The Examiner determines that "it is clear that if a prior art reference teaches the laser radiation being applied, as recited in claim 27, then *inherently* these effects occur." Ans. 26 (emphasis added).

Appellant argues that the Examiner fails to establish a prima facie case, because the Examiner does not identify where the following *claim limitations*, in relevant part, are *disclosed in the prior art*: (i) applying the radiation to cause nonlinear interaction between the pulsed laser radiation and the IOL material; and (ii) selecting the wavelength depending on the UV absorption edge of lens material such that two photon or multiple photon absorption occurs. Appeal Br. 30–31 (emphasis added); *see also* Reply Br. 10–11.

Appellant's argument does not apprise us of error because, as set forth *supra*, the Examiner relies on *inherency* with respect to the alleged missing claim limitations. Our reviewing court recognizes that inherency may

supply a missing claim limitation in an obviousness analysis. *PAR Pharm., Inc. v. TWI Pharms. Inc.*, 773 F.3d 1186, 1195–96 (Fed. Cir. 2014) (citations omitted).

With respect to inherency, Appellant articulates the legal standard and then states that "[n]othing in the cited prior art *makes clear that the missing descriptive matter is necessarily present* as required by law." Appeal Br. 31; *see also id.* at 33 (apparently referencing the Examiner's reliance on inherency with respect to Lin).

The Examiner responds that Lin discloses "the exact same laser, i.e., Ti:Sapphire, at the exact same wavelengths and pulse durations," as claimed, and that Appellant "has failed to demonstrate with any sort of facts, evidence or support how the exact same laser parameters used on the exact same material would somehow fail to result in the same effect in the prior art." Ans. 30 (emphasis added).

We acknowledge that "[t]he mere fact that a certain thing *may* result from a given set of circumstances is not sufficient [to establish inherency]" (*In re Rijckaert*, 9 F.3d 1531, 1533–34 (Fed. Cir. 1993) (citation omitted)), and that inherency "may not be established by probabilities or possibilities." *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981) (*quoting Hansgirg v. Kemmer*, 102 F.2d 212, 214 (CCPA 1939)). Indeed, "the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily *flows* from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1463 (BPAI 1990). However, when the Patent Office has reason to believe that a functional limitation that is asserted to be critical to establishing novelty may be an inherent characteristic of the prior art, it can

require an applicant to prove that the subject matter disclosed in the prior art does not possess that claimed characteristic. *See In re Schreiber*, 128 F.3d 1473, 1478 (Fed. Cir. 1997).

Regarding the first allegedly missing claim limitation (i), we determine that the Examiner has demonstrated a sound basis for believing that Lin's method of applying ultrashort (i.e., a pulse duration of less than one picosecond) pulsed laser radiation for *photoablation* of an *artificial lens* would *necessarily* result in the required change of an optical and/or mechanical property physically *caused by a nonlinear interaction between the pulsed laser radiation and the IOL material*, as claimed.

As discussed *supra*, the Specification teaches that

> [as radiation] intensity increases, *multi-photon absorptions occur first*, and then if the power density of the radiation exceeds a threshold, an optical breakthrough occurs at which a plasma bubble is produced in the material. . . . *If a plasma is generated at a material interface* which may even be located within a material structure, *material removal is effected* from the interface. This is then *referred to as photoablation*.

Spec. 1:36–2:8 (emphasis added). Thus, the Specification teaches that, physically, a pulsed laser beam that causes photoablation to remove material at an interface in IOL material applies radiation at an intensity above a threshold sufficient to cause multiple photon absorption, and therefore, the nonlinear interaction that occurs when there is multiple photon absorption at a focal point of a laser applied to a material, as submitted by Appellant *supra*.

Lin discloses "*ophthalmic laser* systems which have computer-controlled scanning with a non-contact delivery device for . . . *photo-ablation*." Lin, Abstract (emphasis added). Lin also discloses that the

"ablation rate" is described with reference to "synthetic epikeratoplasty" (SEK) (*id.* at 6:34–37), "where the artificial lens is sculpted with the laser to optimize lens curvature" (*id.* at 5:36–40). *See also* Lin 8:7–30 (disclosing, with reference to Figure 1, "a refractive laser system" with a "basic laser 10" having a "wavelength 11 coupled by a scanning device 12 having the beam from focusing optics 14 directed onto a reflecting mirror 15 and into target 16," which may be "synthetic or real corneal tissues for applications of [SEK]"). As also discussed *supra*, Lin discloses that

> [t]he basic laser may also include *ultrashort pulsed lasers*, such as a . . . Ti:sapphire laser . . . , with wavelength ranges of (750-1100 nm), repetition rates of (0.01-100 MHz), energy per pulse of (0.01-100) micro-joules, and *pulse durations of (0.05-10) picoseconds* where focused beam spot size of (0.05-0.5) mm is required *to achieve the ablation threshold*.

Lin 9:10–17 (emphasis added).

Thus, a preponderance of the evidence, including the teachings from the Specification, supports the Examiner's finding that because the object of Lin's invention is to achieve a change in the optical and/or mechanical property of an artificial lens (i.e., sculpting) by applying pulsed laser radiation at an intensity that results in photoablation, Lin inherently discloses that the pulsed laser radiation, with a pulse duration of less than one picosecond (i.e., 0.05 picoseconds), is *such that* the required change of the optical and/or mechanical property is *inherently* caused by nonlinear interaction between the pulsed laser radiation and the IOL material (i.e., photoablation).

Regarding the second allegedly missing claim limitation (ii), Lin also discloses *a wavelength* (i.e., in the near infrared range of 750–1100 nm, which is within Appellant's preferred range of greater than 750 nm

according to the Specification to produce the radiation intensity that achieves *photoablation* (and thus, as disclosed in the Specification *supra*, a nonlinear interaction that occurs due to multiple photon absorption). *See* Spec. 1:28–31 ("[p]referably, [the] laser radiation in the near-infrared spectral region (greater than 750 nm) is used").

The Specification also discloses that

> [p]articularly suitable lens materials are such materials whose absorption edge on the short-wavelength side of the visible spectrum (i. e. the UV absorption edge) is at approximately the $1/n^{th}$ wavelength of the laser radiation used. . . . Of course, *the corresponding wavelength* of the laser radiation may also be *selected in the near-infrared range, depending on the UV absorption edge of the lens material used*, such that it is n times the wavelength of the UV absorption edge (with n being an integer greater than 1).

Spec. 5:17–23 (emphasis added).

Thus, the Examiner has demonstrated a sound basis for believing that Lin's wavelength is *necessarily* selected depending on the UV absorption edge of the lens material, because multiple photon absorption must inherently occur in the lens material to produce Lin's disclosed photoablation. *See also* Bendett ¶ 34 ("the pulsed laser system can be adjusted exactly to the material [wherein] the set of parameters is preselected . . . depending upon the transparency and refractive power of the material to be worked").

Importantly, Appellant fails to identify any errors in the Examiner's findings and reasoning regarding Lin's disclosures, and Appellant does not present any argument or evidence to contradict the inherency finding with respect to Lin as relied on by the Examiner. For example, Appellant does not present any argument or evidence that Lin's photoablation of artificial

lens material, which uses the same laser and radiation intensity parameters—to the extent disclosed in the Specification, achieves such photoablation *without* causing a nonlinear interaction between the pulsed laser radiation and artificial lens material, which must occur, as submitted by Appellant and as discussed in the Specification. Appellant also does not present any argument or evidence that such multiple photon absorption may occur if a wavelength is selected *apart from* considering (or depending on) the UV absorption edge of the IOL material, which Appellant submits is readily determined by those skilled in the art. *See, e.g.*, Appeal Br. 18–19.

In sum, we are not persuaded by Appellant's argument that the Examiner has failed to state a prima face case of obviousness or in Appellant's argument that the Examiner's reliance on inherency is in error.

Accordingly, on the record before us, we sustain the Examiner's rejection of independent claim 27. Appellant chose not to present separate arguments for dependent claims 29, 30, 34, 35, and 56–62, and therefore, for essentially the same reasons presented *supra*, we also sustain the Examiner's rejection of claims 29, 30, 34, 35, and 56–62. Appeal Br. 32.

Rejection V

Claims 27, 29, 30, 34, 35, and 56–62: unpatentable over Bendett and Peyman

Regarding independent claim 27, the Examiner finds that Bendett discloses a method for correcting a visual deficiency of an eye, including "applying pulsed laser pulses having a wavelength between ***800 nm and 1200 nm***" and "a pulse duration between ***50 fs and 1 ps***." Final Act. 21 (citing Bendett ¶¶ 15, 22–24). The Examiner also finds that the laser pulses

disclosed in Bendett form "cavitation bubbles, i.e., optical breakthroughs," and therefore, the laser of Bendett "inherently result[s] in the claimed effect." *Id.* at 21–22 (citing Bendett ¶ 7). The Examiner further finds that although Bendett discloses performing the procedure on an intraocular lens (IOL), Bendett does not disclose that "the IOL is within the eye when this procedure is performed." *Id.* at 20. The Examiner relies on Peyman for disclosing "a method of changing the visual acuity of a patient by applying laser pulses to an IOL while the IOL is implanted into a patient's eye," and the Examiner reasons that it would have been obvious "to perform the method of Bendett on an IOL, as taught by Bendett, after the IOL has already been implanted into the eye, as taught by Peyman." *Id.* (citing Bendett ¶¶ 9, 25, 33, Fig. 1). The Examiner determines that "it is clear that if a prior art reference teaches the laser radiation being applied, as recited in claim 27, then inherently these effects occur." Ans. 26.

Similar to Rejection IV *supra*, Appellant argues that the Examiner's rejection fails to state a prima facie case of obviousness because the Examiner does not identify where the following *claim limitations*, in relevant part, are *disclosed in the prior art*: (i) applying the radiation to cause nonlinear interaction between the pulsed laser radiation and the IOL material; and (ii) selecting the wavelength depending on the UV absorption edge of lens material such that two photon or multiple photon absorption occurs. Appeal Br. 30–31, 33–34. Again, however, Appellant's argument does not address the Examiner's reliance on *inherency* regarding these claim limitations, in order to state a prima facie case of obviousness, and are therefore, not persuasive.

Appellant also argues, generally, with respect to inherency, that "[n]othing in the cited prior art *makes clear that the missing descriptive matter is necessarily present* as required by law," although Appellant does not directly address the Examiner's reliance on Bendett with respect to inherency. Appeal Br. 31; *see id.* at 33–34 (arguing only that the Examiner fails to find that Bendett discloses the allegedly missing claim limitations, but not addressing the Examiner's reliance on inherency relative to the alleged missing claim limitations).

As set forth *supra* with respect to Rejection I, Bendett discloses the destruction of IOL material by photodisruption, which the Specification informs is an optical breakthrough produced when multiple photon absorptions occur that result in a nonlinear interaction between the pulsed laser radiation and the IOL material. Thus, a preponderance of the evidence, including the teachings from the Specification, supports the Examiner's finding that because the object of Bendett's invention is to achieve a change in the optical and/or mechanical property of an IOL by applying pulsed laser radiation at an intensity that results in photodisruption (or further, vaporization of the IOL material as discussed *supra*), Bendett inherently discloses that the pulsed laser radiation, with "an ultrashort laser pulse duration between 50 fs and 1 ps" (Bendett ¶ 23), is *such that* the required change of the optical and/or mechanical property is *inherently* caused by nonlinear interaction between the pulsed laser radiation and the IOL material (i.e., photodisruption).

Bendett further discloses that "broadband laser emission in the spectral range of . . . between 800 nm and 1200 nm which is particularly suitable for refractive cornea surgery" (Bendett ¶ 22) and that "the pulsed

laser system can be adjusted exactly to the material" and also that "the set of parameters is preselected [for the pulsed laser system] depend[s] upon the transparency and refractive power of the material to be worked" (*id.* ¶ 34). Thus, the Examiner has demonstrated a sound basis for believing that Bendett's wavelength is *necessarily* selected depending on the UV absorption edge of the lens material, because multiple photon absorption must inherently occur in the lens material to produce Bendett's disclosed photodisruption.

Again, Appellant fails to identify any errors in the Examiner's findings and reasoning regarding Bendett's disclosures, and Appellant does not present any argument or evidence to contradict the inherency finding with respect to Bendett as relied on by the Examiner. For example, Appellant does not present any argument or evidence that Bendett's photodisruption (or vaporization) of IOL material, which uses the same radiation intensity parameters— to the extent disclosed in the Specification, achieves such photodisruption *without* causing a nonlinear interaction between the pulsed laser radiation and artificial lens material, which must occur, as submitted by Appellant and as discussed in the Specification. Appellant also does not present any argument or evidence that such multiple photon absorption may occur if a wavelength is selected *apart from* considering (or depending on) the UV absorption edge of the IOL material, which Appellant submits is readily determined by those skilled in the art. *See, e.g.*, Appeal Br. 18–19.

In sum, we are not persuaded by Appellant's argument that the Examiner has failed to state a prima face case of obviousness or in Appellant's argument that the Examiner's reliance on inherency is in error.

Accordingly, on the record before us, we sustain the Examiner's rejection of independent claim 27. Appellant chose not to present separate arguments for dependent claims 29, 30, 34, 35, and 56–62, and therefore, for essentially the same reasons presented *supra*, we also sustain the Examiner's rejection of claims 29, 30, 34, 35, and 56–62. Appeal Br. 32.

Rejection VI

Claims 27, 29, 30, 34, 35, and 56–62: unpatentable over Bischoff '443 and Peyman

Regarding Bischoff '443, the Examiner finds that Bischoff '443 discloses "a method for laser-surgical correction of visual deficiencies in ophthalmology . . . using laser pulses in the femtosecond (fs) range that causes non-linear interactions in tissue to cause the desired change" and also that selecting laser pulses may be changed with respect to an optical parameter to generate or stop the generation of optical breakthroughs. Final Act. 24 (citing Bischoff '443 ¶¶ 19, 49). The Examiner also finds, *inter alia*, that although Bischoff '216 is silent as to the wavelength emitted by the laser, Bischoff's pulsed laser source "emits light at *some* wavelength" and "it would be *obvious to choose* a wavelength in the near-infrared range." Ans. 31 (emphasis added). The Examiner further finds that Bischoff '443 discloses "applying laser pulses to a lens of an eye," but fails to disclose applying laser pulses to an IOL; the Examiner relies on Peyman for disclosing that "a method of changing the visual acuity of a patient by applying laser pulses to an IOL while the IOL is implanted into a patient's eye." Final Act. 24–25 (citing Peyman, Abstract, Fig. 1). The Examiner reasons that it would have been obvious "to perform the method of Bischoff

['443] on an IOL that has already been implanted into the eye, as taught by Peyman." *Id.* at 25.

Similar to Rejections IV and V *supra*, Appellant argues that the Examiner's rejection fails to state a prima facie case of obviousness because the Examiner does not identify where the *claim limitation* of selecting the wavelength depending on the UV absorption edge of lens material such that two photon or multiple photon absorption occurs is *disclosed in the prior art*.[7] Appeal Br. 30–31, 34–35; Reply Br. 13 ("there is no disclosure related to an UV absorption edge").

However, Appellant's argument fails to address the Examiner's rejection, which relies on the reasoning that it would have been "obvious to choose"—which may be stated as "obvious to try," or even characterized as a "design choice" or alternatively, supported by *KSR Int'l Co. v. Teleflex*

[7] Unlike Rejections IV and V, however, Appellant does not dispute that the Examiner has identified in Bischoff '443 the disclosure of the claim limitation of applying pulsed laser radiation, with a pulse duration as claimed, to cause nonlinear interaction between the pulsed laser radiation and the IOL material. Appeal Br. 34–35. Indeed, not only does Bischoff '443 disclose the general conditions of the claim (i.e., applying ultrashort pulsed laser radiation having "a duration in the fs range" (Bischoff '443 ¶ 38) to a lens to create an optical breakthrough (*id.*, Abstract), "utiliz[ing] the threshold dependence of the non-linear interaction between the treatment radiation and the material" (*id.* ¶ 19), but Bischoff also discloses that laser pulse duration is a result-effective variable. *See, e.g.*, Bischoff '443 ¶ 4 (disclosing that it is known in the prior art that "[linear] interaction[] strongly depends on the pulse duration"). "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456 (CCPA 1955). This rule is limited to cases in which the optimized variable is a "result-effective variable." *In re Antonie*, 559 F.2d 618, 620 (CCPA 1977).

Inc., 550 U.S. 398, 421 (2007) ("a person of ordinary skill is also a person of ordinary creativity, not an automaton").

Appellant states that "[a]s is known by those of skill in the art, nonlinear interaction occurs when two photon or multiphoton absorption occurs at a focal point of a laser applied to a material or tissue" (Appeal Br. 16), and Bischoff '443 implies multiple photon absorption occurs because nonlinear interaction or optical breakthroughs are created by the pulsed laser beam source (Bischoff '443). Accordingly, the Examiner's reasoning is supported by adequate underpinnings. Thus, Appellant's conclusory argument, which does not address the Examiner's reasoning(s), does not apprise us of error in the Examiner's determination that it would have been obvious to select a wavelength to allow the required multiple photon absorption in Bischoff '443. As discussed *supra*, Bendett evidences that "the pulsed laser system can be adjusted exactly to the material [wherein] the set of parameters is preselected . . . depending upon the transparency and refractive power of the material to be worked" (Bendett ¶ 34) and Bendett also evidences that "the spectral region between 800 nm and 1200 nm . . . is particularly suitable for refractive cornea surgery" (Bendett ¶ 22).

Additionally, as discussed *supra*, Appellant does not present any argument or evidence that such multiple photon absorption may occur if a wavelength is selected *apart from* considering (or depending on) the UV absorption edge of the IOL material, which Appellant submits is readily determined by those skilled in the art.

Accordingly, we sustain the Examiner's rejection of independent claim 27. Appellant chose not to present separate arguments for dependent claims 29, 30, 34, 35, and 56–62, and therefore, for essentially the same

reasons presented *supra*, we also sustain the Examiner's rejection of claims 29, 30, 34, 35, and 56–62. Appeal Br. 35.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
27, 29, 30, 34, 35, 56–62	112, first paragraph	written description: "said radiation being applied such that . . . "	27, 29, 30, 34, 35, 56–62	
27, 29, 30, 34, 35, 56–62	112, first paragraph	written description: requirement, regarding the claim limitation "wherein a wavelength of the pulsed laser radiation is selected depending on . . ."	27, 29, 30, 34, 35, 56–62	
27, 29, 30, 34, 35, 56–62	112, first paragraph	enablement requirement	27, 29, 30, 34, 35, 56–62	
27, 29, 30, 34, 35, 56–62	112, second paragraph	indefiniteness: for omitting essential steps	27, 29, 30, 34, 35, 56–62	
27, 29, 30, 34, 35, 56–62	112, second paragraph	indefiniteness: "absorption edge of lens materials"		27, 29, 30, 34, 35, 56–62
58	112, second paragraph	indefiniteness: the claim recitation, "after an irradiating step is carried out"		58
59	112, second paragraph	indefiniteness: "it is unclear if the residual deviation is actually required to be measured"	59	

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
61	112, second paragraph	indefiniteness: "it is unclear what is required to produce no optical breakthroughs"		61
27, 29, 30, 34, 35, 56–62	103(a)	Lin, Peyman	27, 29, 30, 34, 35, 56–62	
27, 29, 30, 34, 35, 56–62	103(a)	Bendett, Peyman	27, 29, 30, 34, 35, 56–62	
27, 29, 30, 34, 35, 56–62	103(a)	Bischoff '443, Peyman	27, 29, 30, 34, 35, 56–62	
Overall Outcome			27, 29, 30, 34, 35, 56–62	

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED