

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

ASAHI GLASS CO., LTD. and AGC	)	
FLAT GLASS NORTH AMERICA, INC.,	)	
	)	
Plaintiffs,	)	
	)	
v.	)	Civ. No. 09-515-SLR
	)	
GUARDIAN INDUSTRIES CORP.,	)	
	)	
Defendant.	)	

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**MEMORANDUM OPINION**

Dated: August 20, 2012  
Wilmington, Delaware

  
**ROBINSON, District Judge**

## **I. INTRODUCTION**

On July 15, 2009, plaintiffs Asahi Glass Co., Ltd. and AGC Flat Glass North America, Inc. (collectively, “plaintiffs”) filed a complaint against Guardian Industries Corporation (“defendant”) alleging infringement of plaintiffs’ U.S. Patent Nos. 3,664,938 (“the ‘938 patent”) and 6,193,856 (“the ‘856 patent”) (hereinafter, collectively the “patents-in-suit”). (D.I. 1) A jury trial on the validity of claim 16 of the ‘856 patent and claims 1, 3-4, 7-11, 18-20 and 25 of the ‘938 patent was held between October 17 and 21, 2011. Following a verdict of validity, judgment was entered for plaintiffs. (D.I. 225, 230) Presently before the court are defendant’s renewed motion for judgment as a matter of law (“JMOL”) and motion for a new trial, as well as defendant’s arguments to the court on the issue of inequitable conduct. (D.I. 233, 235) The court has jurisdiction over these matters pursuant to 28 U.S.C. § 1338.

## **II. BACKGROUND**

### **A. Technology Overview**

This case involves technology for applying thin film coatings to glass. One popular metallic coating, titanium dioxide, is highly refractive and also imparts “antibacterial, antifouling or drip flowing” properties to glass. (‘856 patent, col. 13:33-37) Coatings are not applied directly onto glass. Rather, a “sputtering” process is employed. Generally, sputtering involves bombarding a sputtering target with charged ions. Metallic atoms from the target (the “target material”) are displaced and fall to the surface of a sheet of glass passing below the target. This process of displacing atoms from the sputtering target is analogous to using a cue ball to hit a billiard ball. The

result is a thin metal oxide film being deposited on the glass surface.

Sputtering targets may be made by several processes, such as sintering and plasma spraying. Sintering involves creating a target by placing a powder form of the target in a mold and subjecting it to heat and pressure. By this process, the powder solidifies into a mass that becomes the target. Plasma spraying, as its name implies, involves heating and spraying powder material onto a target substrate where it solidifies and hardens. Semi-molten powder particles are coated onto a substrate (such as a cylindrical tube) in layers until the desired thickness is achieved.

### **B. Patents-in-Suit**

The '856 and '938 patents are related as parent and continuation applications; they have a common specification. Both patents are entitled "target and process for its production, and method for forming a film having a highly refractive index." The '856 patent was filed on March 12, 1998 and claimed priority to a PCT application (PCT/JP96/00767) filed March 25, 1996 which, in turn, claims priority to Japanese application JP 7-215074 ("JP-074") filed August 23, 1995. The '938 patent was filed on December 5, 2000 as a continuation of the application issuing as the '856 patent. The '856 patent issued on February 27, 2001 and the '938 patent issued on January 1, 2002.

The patents teach that excellent optical properties are imparted to glass by employing both a high refractive index film and a low refractive index film; the larger the difference between the two, the better the result. ('856 patent, col. 1:33-36) Direct current (or "DC") sputtering is "most suitable for forming a film over a large area" of

glass. (*Id.*, col. 1:49-51) Reactive (DC) sputtering is a process whereby a metallic target having electroconductivity is subjected to sputtering in an atmosphere containing oxygen. Reactive sputtering has certain pitfalls, such as poor productivity and high cost. (*Id.*, col. 1:53-60)

The inventors provide an “electroconductive sputtering target which can be formed into any desired shape and which is capable of forming a high refractive index film at a high speed by DC sputtering, a process for its production, and a method for forming a high refractive index film using such a target.” (*Id.*, col. 2:56-61) The target material of the invention comprises a metal oxide of the formula  $MO_x$  as the main component, where M is selected from the group consisting of Ti (titanium), Nb (niobium), Ta (tantalum), Mo (molybdenum), W (tungsten), Zr (zirconium) and Hf (hafnium). Importantly, the metal oxide is deficient in oxygen as compared with the stoichiometric composition. (*Id.*, col. 2:64-col. 3:4) Thus, when M in  $MO_x$  is Mo and/or W, x is preferably within the range of  $2 < x < 3$ . (*Id.*, col. 3:19-21) When the metal is selected from the group consisting of Ti, Zr and Hf, x is preferably within a range of  $1 < x < 2$ . (*Id.*, col. 3:21-24) As a comparative example, stoichiometrically-balanced titanium oxide has the molecular formula  $TiO_2$ . The sub-stoichiometric targets of the patents ( $TiO_x$ ) may have the formula  $TiO_{1.80}$  or  $TiO_{1.90}$ .

The patents refer to the advantages of these formulas.

By using the sputtering target of the present invention, a transparent film having a high refractive index can be formed at a high speed by DC sputtering. . . [and] a film having a high refractive index can be produced at a high speed and under a stabilized condition.

(*Id.*, col. 13:13-21) The targets are easily produced in a variety of shapes and resist

thermal shock, cracking and breakage when high sputtering power is imparted, thus increasing productivity. (*Id.*, col. 13:22-27, 13:38-45)

### 1. Sputtering target claims

This case involves both what the parties refer to as “sputtering target claims” (‘856 patent claim 16 and ‘938 patent claims 10-11 and 18-20) and “film forming claims” (‘938 patent claims 1, 3-4 and 7-9). Claim 16 of the ‘856 reads as follows.

16. A sputtering target comprising a substrate and a target material formed on the substrate, wherein

the target material comprises as a main component an oxygen deficient oxide;

the oxygen deficient oxide comprises at least one metal oxide of a chemical formula  $TiO_x$  that is deficient in oxygen as compared with a stoichiometric composition of the at least one metal oxide;  
and

$1 < x < 2$ .

Independent claim 10 of the ‘938 patent is also directed to sputtering targets, and claims as follows.

10. A sputtering target comprising

a substrate;

a target material formed on the substrate; and

an undercoat of a metal or alloy between the target material and the substrate, wherein

the target material comprises as the main component an oxygen deficient oxide;

the oxygen deficient oxide comprises a metal oxide of a chemical formula  $TiO_x$  that is deficient in oxygen as compared with a stoichiometric composition of the metal oxide; and  $1 < x < 2$ .

Claims 11 and 18-20 of the ‘938 patent depend from claim 10 and add the additional

limitations of a specific thermal expansion coefficient for the target material's undercoat (claim 10), target material thickness (claim 18) and target resistivity (claims 19-20).

The patented sputtering targets have three layers: (1) a substrate, or inner layer; (2) an undercoat, or middle layer; and the (3) target material, or the outer layer. The patents provide that the substrate may be "various metals or alloys" such as "stainless steel, copper or titanium." (*Id.*, col. 4:58-59) The undercoat may be made of an electroconductive powder of several metals or metal alloys,<sup>1</sup> and preferably has a thickness from 30 to 100µm. (*Id.*, col. 5:21-25) The undercoat reduces the thermal expansion between the target material to be sprayed and the substrate. (*Id.*, col. 5:1-5) The material for the undercoat must be changed depending upon the thermal expansion coefficient of the ceramic (target material) layer. (*Id.*, col. 5:26-28)

## 2. Film forming claims

Claim 1 of the '938 patent is directed to a film forming method, as follows.

1. A method for forming a film, the method comprising sputtering a target, wherein

the sputtering target comprises a substrate and a target material formed on the substrate;

the target material comprises as the main component an oxygen deficient oxide;

the oxygen deficient oxide comprises a metal oxide of a chemical formula  $TiO_x$  that is deficient in oxygen as compared with a stoichiometric composition of the metal oxide; and  $1 < x < 2$ .

Claims 3-4 and 7-9 depend from claim 1 and further limit the claim so as to require specific target resistivities (claims 3-4), that the sputtering occur in an argon-containing

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<sup>1</sup>For example, "Mo, Ti, Ni, Nb, Ta, W, Ni-Al, Ni-Cr, Ni-Cr-Al, Ni-Cr-Al-Y, or Ni-Co-Cr-Al-Y." ('856 patent, col. 5:21-23)

atmosphere (claims 7-9) and that the film has a specific refractive index (claim 9).

The specification provides that a “uniform transparent film can be formed at high speed when sputtering is carried out by using the target of the present invention in an argon atmosphere or in a mixed atmosphere of argon and a small amount of [oxygen] under a pressure of from  $1 \times 10^{-3}$  to  $1 \times 10^{-2}$  Torr.” (*Id.*, col. 6:31-35) There is no need to introduce an excessive amount of oxygen gas (relative to the metal atoms) as with other targets and, therefore, the invention reduces the deposition of oxygen atoms on the target surface, thereby reducing deterioration and increasing the film forming speed. (*Id.*, col. 6:43-67)

### **C. Procedural Posture**

The resolution of the pending motions will be facilitated by a review of the procedural history of this litigation. In response to plaintiffs’ allegations of infringement, defendant originally brought declaratory judgment counterclaims of noninfringement and invalidity under “35 U.S.C. §§ 101, 102, 103, 112 and 113.” (D.I. 9) On March 3, 2011, defendant moved to amend its affirmative defenses and counterclaims to add new allegations of inequitable conduct. The court pauses to explain the specifics of defendant’s motion, as it relates to several issues at bar.

As explained in the court’s prior order, defendant sought to add two new theories of inequitable conduct, both relating to concealing or misrepresenting the true inventorship of pending claims to the United States Patent and Trademark Office (“PTO”) during prosecution of the ‘856 and ‘938 patents. Defendant asserted that plaintiffs filed false declarations and statements during prosecution of the ‘856 patent in order to overcome a § 102(a) prior art rejection. Specifically, several pending claims

(directed to sputter targets) stood rejected based on prior art publication “JP-469,”<sup>2</sup> naming inventors Akira Mitsui (“Mitsui”), Takuji Oyama (“Oyama”), and Kenichi Sasaki (“Sasaki”). Plaintiffs added Sasaki and Oyama as inventors to the pending application and, through declarations, averred that claim 20 of the application later issuing as the ‘856 patent was the invention of Mitsui, Oyama and Sasaki and not the invention of other inventors already of record (Otojiro Kida (“Kida”), Eri Suzuki (“Suzuki-Komatsu”)<sup>3</sup>, and Atsushi Hayashi (“Hayashi”)). (D.I. 89, ex. E; D.I. 110, ex. 3-3 at JA-224-25; JA-236-37; JA-239-40; JA-267-69) Claim 20 issued as claim 16 of the ‘856 patent. (D.I. 110, ex. 3-3 at JA-234)

During prosecution of the application later issuing as the ‘938 patent, also in overcoming a rejection over JP-469 under 35 U.S.C. § 102(a), the applicants affirmatively stated that then-pending claims 12, 15-17, 21 and 31-33 are the invention of Mitsui, Oyama and Sasaki and are not the invention of Kida, Suzuki-Komatsu or Hayashi. (*Id.*, ex. 4-2 at JA-367-68, JA-377-79; JA-381-82) Claims 12, 15-17, 21 and 31-33 issued as independent claims 1, 4-6, 10 and 21-22 of the ‘938 patent. (*Id.* at JA-423) The § 102(a) rejection was effectively traversed on these grounds.

Defendant’s proposed amended complaint contained inequitable conduct allegations that Sasaki and Suzuki-Komatsu were improperly named as inventors for the three-inventor claims and that Kida was improperly excluded, for the purpose of

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<sup>2</sup>Japanese Patent Abstract Publication No. 07-233469, published September 5, 1995.

<sup>3</sup>Suzuki has since been married and is now known as Eri Komatsu. To minimize confusion, the court will refer to Ms. “Suzuki-Komatsu.”



traversing the § 102(a) rejections and obtaining allowance of the claims. (D.I. 89, ex. A) The court ultimately denied defendant's motion to amend on August 12, 2011 on the basis of unexplained delay, given that defendant's request to amend came six months after the August 15, 2010 deadline to amend the pleadings and after the close of fact discovery. (D.I. 174 at 4-6)

On September 26, 2011, the court ruled on plaintiffs' *Daubert* motion to exclude the testimony of defendant's expert, Dr. Mark Horn ("Horn"). (D.I. 185) In its memorandum order of that date, the court excluded Horn's opinions on written description and enablement (as articulated in his expert report) because they were not helpful to the jury. (*Id.* at ¶ 5) With respect to anticipation and obviousness, the court found that Horn did not first construe the claims and then provide a limitation-by-limitation comparison of each claim to each prior art reference.<sup>4</sup> (*Id.* at ¶¶ 6-8) Notwithstanding, the court allowed defendant to demonstrate where, in Horn's report, he provided the required analyses.

Also on September 26, 2011, the court issued a memorandum opinion construing the disputed terms of the '856 and '938 patents and resolving several motions for summary judgment. (D.I. 183) Specifically, the court granted summary judgment of infringement of the asserted product claims ('856 patent claim 16 and '938 patent claims 10-11 and 18-20) and granted summary judgment of noninfringement of the asserted process claims ('856 patent claims 11-12, 14, and 15 and '938 patent claims 23-25). (*Id.* at 17-19) The court also granted plaintiffs' motion for summary judgment of

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<sup>4</sup>See *Oxford Gene Tech. Ltd. v. Mergen, Ltd.*, 345 F. Supp. 2d 431, 435-37 (D. Del. 2004).

infringement of the film-forming claims (claims 3, 4, and 7-9 of the '938 patent). (*Id.* at 19)

At the summary judgment stage, defendant asserted that the '856 and '938 patents are invalid as obvious in view of the following prior art: (1) U.S. Patent No. 4,379,040 ("Gillery"); (2) U.S. Patent No. 3,309,302 ("Heil"); (3) U.S. Patent No. 4,690,745 ("Klein"); (4) U.S. Patent No. 5,480,531 ("Weigert"); (5) Japanese Patent Application No. 62-161945 ("Sakurai"); (6) U.S. Patent No. 5,209,835 ("Makino"); (7) Japanese Patent Abstract No. 06-330297 ("Kodera"); (8) U.S. Patent No. 4,422,917 ("Hayfield"); (9) a 1991 article in Electronics and Optics entitled "Electrical Conductivity of Plasma-Sprayed Titanium Oxide (Rutile) Coatings" by Ohmori et. al ("Ohmori"); (10) U.S. Patent No. 4,931,213 ("Cass"); (11) U.S. Patent No. 5,354,446 ("Kida"); (12) JP-469; (13) U.S. Patent No. 5,110,637 ("Ando"); and (14) Great Britain Patent No. 1,438,462 ("Hoechst"). (D.I. 121 (citing D.I. 124, exhibits to ex. DD)) As noted in the court's prior opinion, it was defendant's position that Gillery, alone, is sufficient to render the claims obvious, and that the rest of the prior art buttresses the obviousness conclusion in other respects. (D.I. 183 at 27-28) The court denied defendant's motion for summary judgment, stating that defendant had not made out even a *prima facie* case of obviousness on the record before it. Specifically, defendant's obviousness arguments were mostly devoid of citations to expert testimony, and defendant did not articulate a motivation to combine specific references or a reasonable expectation of success regarding such combinations. (*Id.* at 28-30)

The court also denied defendant's motion for summary judgment of invalidity of the '856 and '938 patents made on the bases of lack of adequate written description

and lack of enablement. (*Id.* at 25, 30) With respect to enablement, the court noted that defendant did not rely on expert testimony, and did not specifically address the factors delineated in *In re Wands*, 858 F.2d 731 (Fed. Cir. 1988). (D.I. 183 at 25) The court found defendant's written description arguments flawed in other respects. (*Id.* at 22-24)

At the pretrial conference, defendant offered Horn's report as its proffer on written description and enablement. (D.I. 190 at 40) The parties also addressed the admissibility of Japanese Publication No. 07-166340 (the "Tani" reference, or "Tani") at trial. As articulated in the court's prior opinion, Tani was utilized by the Japanese Patent Office in rejecting the Japanese counterparts to the patents-in-suit in 2005, but did not come to the attention of American counsel at that time, nor was it identified by defendant as potential invalidating prior art. Horn was deposed on April 12, 2011. In July 2011, Tani was utilized by the PTO in rejecting the patents-in-suit in co-pending reexamination proceedings. Horn prepared a (third) supplemental expert report on the reference. Defendant moved to file a summary judgment motion for invalidity based on Tani, which was denied by the court. (D.I. 166, 184)

On October 3, 2011, on a supplemented record, the court held that Horn's opinion on anticipation was legally insufficient and excluded that issue from trial. (D.I. 191 at ¶ 1) By the same order, the court held that: (1) defendant would be required to file a proffer with respect to written description and enablement prior to those issues being tried to the jury; and, notwithstanding the court's denial of defendant's motion to amend to add new theories of inequitable conduct, (2) defendant could seek to establish invalidity based on incorrect inventorship at trial pursuant to 35 U.S.C. § 102(f); and (3)

defendant could try inequitable conduct based on plaintiffs' alleged withholding of Makino from the PTO to the bench following the jury trial. (*Id.* at ¶¶ 5-6) The court also allowed defendant to present an obviousness theory based on Tani at trial, following additional expert discovery on the issue. (*Id.* at ¶ 4)

Also on October 3, 2011, the court issued an order entering judgment of infringement of claim 25 of the '938 patent, consistent with the court's September 26, 2011 memorandum opinion.<sup>5</sup> (D.I. 193)

A jury trial on validity was held between October 17 and 21, 2011, during which time defendant presented its improper inventorship and obviousness theories to the jury. Defendant contended that claim 16 of the '856 patent and claims 1, 3, 4, 7, 8, 9, 10, 11, 18, 19, 20 and 25 of the '938 patent are obvious in view of the following prior art: (1) Tani; (2) Heil; (3) Gillery; (4) Klein; (5) Weigert; (6) Cass; (7) Kida; (8) Sakurai; (9) Hayfield; (10) Kodera; (11) Makino; (12) Ohmori; (13) Hoechst; (14) Mitsui; and a non-summary judgment reference, (15) WO 94-28691 ("Hyllberg"). The parties filed motions for JMOL pursuant to Federal Rule of Civil Procedure 50(a). (D.I. 218, 221)

There are several jury charges at issue on defendant's present motions. With respect to JP-469, the jury was charged as follows:

Guardian [ ] contends that JP 07-233469 ("Mitsui") (DTX-001) is prior art to be considered in your obviousness determination. You are instructed,

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<sup>5</sup>Plaintiffs stated that they inadvertently listed claim 25 amongst the method claims in its summary judgment papers, for which summary judgment of noninfringement was entered. The parties agreed that claim 25 depended from claim 10, for which summary judgment of infringement was granted. (D.I. 188) Defendant renewed its opposition on the grounds previously articulated at summary judgment with respect to the product claims, and did not otherwise oppose plaintiffs' motion for the entry of judgment with respect to claim 25. (*Id.*; D.I. 190 at 4-6)

however, that this prior art reference can only be considered as prior art if you determine that AGC named the incorrect inventors for claim 16 of the '856 patent and claims 1, 4, 10 and 20 of the '938 patent. In other words, if AGC named the correct inventors for the above claims, the inventors' own prior publications cannot be used to invalidate their patent.

(D.I. 223 at 22-23) With respect to the inventorship requirement, the jury was instructed that

[i]nventorship is determined on a claim-by-claim basis. An individual need have only contributed to the invention of one of the patent's claims in order to be a named inventor on the patent.

Guardian contends that Otojiro Kida was an inventor of the subject matter of claim 16 of the '856 patent and claims 1, 4, 10 and 20 of the '938 patent and should have been included as an inventor due to his contribution to those claims. Guardian also contends that Kenichi Sasaki was improperly listed as an inventor because he did not contribute to the subject matter of those claims.

A person is an inventor if he contributed in some significant manner to the conception or reduction to practice of the invention, made a contribution to the claimed invention that is not insignificant in quality, when that contribution is measured against the dimension of the full invention, and did more than merely explain to the real inventors well-known concepts and/or the current state of the art. Likewise, merely helping with experimentation, by carrying out the inventor's instructions, does not make someone an inventor.

(*Id.* at 29-30)

On October 21, 2011, the jury returned its verdict that claim 16 of the '856 patent and claims 1, 3-4, 7-11, 18-20 and 25 of the '938 patent are not invalid due to obviousness. (D.I. 225) The jury also declined to find either patent invalid for failure to list the proper inventorship. (*Id.*) Defendant has renewed its motion for JMOL pursuant to Federal Rule of Civil Procedure 50(b)<sup>6</sup> and has also moved for a new trial. (D.I. 233, 235) Additionally, defendant has submitted its brief regarding the bench issue of

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<sup>6</sup>The parties' respective Rule 50(a) motions will be denied as moot. (D.I. 218, 221)

inequitable conduct. (D.I. 239) The court addresses these issues in turn.

### **III. STANDARDS**

#### **A. Motion for Judgment as a Matter of Law**

To prevail on a renewed motion for judgment as a matter of law following a jury trial under Federal Rule of Civil Procedure 50(b), the moving party “must show that the jury’s findings, presumed or express, are not supported by substantial evidence or, if they were, that the legal conclusions implied [by] the jury’s verdict cannot in law be supported by those findings.” *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1348 (Fed. Cir. 1998) (quoting *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893 (Fed. Cir. 1984)). “Substantial’ evidence is such relevant evidence from the record taken as a whole as might be acceptable by a reasonable mind as adequate to support the finding under review.” *Perkin-Elmer Corp.*, 732 F.2d at 893. In assessing the sufficiency of the evidence, the court must give the non-moving party, “as [the] verdict winner, the benefit of all logical inferences that could be drawn from the evidence presented, resolve all conflicts in the evidence in his favor, and in general, view the record in the light most favorable to him.” *Williamson v. Consol. Rail Corp.*, 926 F.2d 1344, 1348 (3d Cir. 1991); *Perkin-Elmer Corp.*, 732 F.2d at 893. The court may not determine the credibility of the witnesses nor “substitute its choice for that of the jury between conflicting elements of the evidence.” *Id.* In summary, the court must determine whether the evidence reasonably supports the jury’s verdict. See *Dawn Equip. Co. v. Kentucky Farms Inc.*, 140 F.3d 1009, 1014 (Fed. Cir. 1998).

## **B. Motion for a New Trial**

The decision to grant or deny a new trial is within the sound discretion of the trial court and, unlike the standard for determining judgment as a matter of law, the court need not view the evidence in the light most favorable to the verdict winner. *See Allied Chem. Corp. v. Darflon, Inc.*, 449 U.S. 33, 36 (1980). Federal Rule of Civil Procedure 59(a) provides, in pertinent part:

A new trial may be granted to all or any of the parties and on all or part of the issues in an action in which there has been a trial by jury, for any of the reasons for which new trials have heretofore been granted in actions at law in the courts of the United States.

New trials are commonly granted in the following situations: (1) where the jury's verdict is against the clear weight of the evidence, and a new trial must be granted to prevent a miscarriage of justice; (2) where newly-discovered evidence surfaces that would likely alter the outcome of the trial; (3) where improper conduct by an attorney or the court unfairly influenced the verdict; or (4) where the jury's verdict was facially inconsistent. *See Zarow-Smith v. N.J. Transit Rail Operations*, 953 F. Supp. 581, 584 (D.N.J. 1997) (citations omitted). The court, however, must proceed cautiously and not substitute its own judgment of the facts and assessment of the witnesses' credibility for the jury's independent evaluation. Nevertheless,

[w]here a trial is long and complicated and deals with a subject matter not lying within the ordinary knowledge of jurors a verdict should be scrutinized more closely by the trial judge than is necessary where the litigation deals with material which is familiar and simple, the evidence relating to ordinary commercial practices. An example of subject matter unfamiliar to a layman would be a case requiring a jury to pass upon the nature of an alleged newly discovered organic compound in an infringement action.

*Lind v. Schenley Indus. Inc.*, 278 F.2d 79, 90-91 (3d Cir. 1960).

## IV. DISCUSSION

### A. Inventorship

#### 1. Defendant's arguments

In its motion for JMOL, defendant argues that the court incorrectly sought and obtained an advisory verdict from the jury regarding inventorship, because the jury was not asked whether individual claims are invalid for having the wrong inventorship, only whether the inventorship for each patent (as a whole) is correct. (D.I. 234 at 1)

Defendant also argues that the jury instructions were in error for “suggest[ing] that a person can be a co-inventor merely if he contributed in some significant manner to the [conception] or reduction to practice of the invention,” whereas “[m]erely contributing to the reduction to practice is not enough to qualify a person as a joint inventor.” (*Id.* at 3)

Under the correct standard, defendant argues that it proved that Kida is an indispensable inventor of claims 1, 4, 10 and 20 of the '938 patent and claim 16 of the '856 patent. (*Id.* at 5) According to Mitsui, of the seven inventors, the following people contributed to the disclosure of plasma sprayed TiO<sub>x</sub> targets: Oyama, Sasaki, Susuki-Komatsu, Hayashi, and himself, Mitsui. (D.I. 246 at 264:10-14) Oyama and Sasaki contributed to film-forming with TiO<sub>x</sub> targets (*id.* at 264:21-25), and Osaki and Mitsui contributed to non-TiO<sub>x</sub> sputtering targets (*id.* at 265:3-6). According to Mitsui, Kida was the individual who “decided to use the undercoat” layer of the target described in claim 10 of the '938 patent. (*Id.* at 255:2-12) Mitsui testified that he made a titanium sub-oxide target “by [him]self,” with Sasaki and Oyama helping test that target. (*Id.* at 223:23-224:7; D.I. 247 at 528:19-529:12) More specifically, Mitsui



came up with the idea of converting [a chromium titanium] alloy target into an oxide target, and [he] made the product of that target. When [he] tested that target, [he] realized that the deposition rate of the target was faster than [he] expected. And at that time, [he] thought of using that to apply  $\text{TiO}_2$  films in the broader range of applications, without limiting it to the automotive application. And so [he] removed the chromium oxide component from that and I made the  $\text{TiO}_x$  target. In other words, made of only  $\text{TiO}_x$ . When [he] tested that target, the result was such that the deposition rate was seven times faster, which was very surprising to [him].

(D.I. 247 at 515:12:516:4)

Mitsui stated that Kida proposed “various ideas” for plasma spraying and Kida, in fact, made the first plasma sprayed target. (D.I. 246 at 245:19-246:18) Mitsui stated that neither he nor Sasaki or Oyama knew how to make plasma spray targets. (*Id.* at 245:19-246:18) Sasaki testified that both he and Mitsui separately conceived of the idea to make oxygen deficient titanium oxide targets. (*Id.* at 314:13-18; 318:3-319:6) Sasaki confirmed that he does not know how to make targets; Mitsui was consulted for this purpose. (*Id.* at 319:10-15) Sasaki views his contribution as “making a  $\text{TiO}_2$  film using the  $\text{TiO}_x$  target.” (*Id.* at 325:18-326:1) Sasaki does not have an understanding of the idea of putting an undercoat on a substrate for a target, because he “never made a target.” (*Id.* at 326:25-327:6; *see also id.* at 313:9-15; 315:6-9 (Sasaki only “used targets for deposition”))

Defendant also cites testimony by inventor Hayashi, who stated that it was Kida’s ideas to reduce the powder in the course of making the  $\text{TiO}_x$  target, the spray for making it and the materials. (*Id.* at 273:24-274:13) According to Hayashi, Oyama and Sasaki contributed “film forming,” Kida contributed “the spray and the non- $\text{TiO}_x$ ,” and Susuki-Komatsu contributed “plasma spray [for] non- $\text{TiO}_x$ .” (D.I. 247 at 535:2-11) Suzuki-Komatsu did not recall whether she ever created any targets of any kind; she does not

know “in detail” what a sputtering target is and does not know what a TiO<sub>x</sub> target is. (D.I. 246 at 291:7-292:11; 296:7-8) According to Suzuki-Komatsu, her contribution was that she “did typing that Mr. Kida asked me to do and I analyzed data,” which may have included “density measurements, thermal analysis, distribution of particle size [and] strength measurements,” or analyses “similar to the kind that produced the test results included in th[e] patent[s].” (*Id.* at 292:18-293:3; 294:4-13) Suzuki-Komatsu stated that she did not “contribute any ideas based on [her] measurements.” (*Id.* at 296:24-297:5)

## 2. Jury instructions

Defendant takes issue with the jury instruction that “[a] person is an inventor if he contributed in some significant manner to the conception **or** reduction to practice of the invention” (D.I. 223 at 29-30) (emphasis added), in view of the Federal Circuit’s statement that “[b]ecause conception is the touchstone of inventorship, each joint inventor must **generally** contribute to the conception of the invention.” *Ethicon, Inc. v. U.S. Surgical Corp.*, 135 F.3d 1456, 1460 (Fed. Cir. 1998) (citing *Burroughs Wellcome Co. v. Barr Lab., Inc.*, 40 F.3d 1223, 1227-28 (Fed. Cir. 1994) (internal quotation omitted) (emphasis added)). As the emphasized language from *Ethicon* suggests, there is no bright-line rule in this regard. By contrast, the Federal Circuit has explained that, under some circumstances,

the reduction to practice can be the most definitive corroboration of conception, for where the idea is in constant flux, it is not definite and permanent. A conception is not complete if the subsequent course of experimentation, especially experimental failures, reveals uncertainty that so undermines the specificity of the inventor’s idea that it is not yet a definite and permanent reflection of the complete invention as it will be used in practice.

*Burroughs Wellcome*, 40 F.3d at 1229. The court’s instruction, read in full, advised that “[a] person is an inventor if he contributed in some significant manner to the conception or reduction to practice of the invention, made a contribution to the claimed invention that is not insignificant in quality, when that contribution is measured against the dimension of the full invention, **and** did more than merely explain to the real inventors well-known concepts and/or the current state of the art” and that “merely helping with experimentation” (i.e., routine reduction to practice) does not suffice. (D.I. 223 at 28-29) (emphasis added) Indeed, the court’s language mirrors that in *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1351 (Fed. Cir. 1998):

All that is required of a joint inventor is that he or she[:] (1) contribute in some significant manner to the conception **or** reduction to practice of the invention[:]; (2) make a contribution to the claimed invention that is not insignificant in quality, when that contribution is measured against the dimension of the full invention[:]; and (3) do more than merely explain to the real inventors well-known concepts and/or the current state of the art.

*Id.* at 1351 (citations omitted) (emphasis added). The court discerns no error in this respect.

### **3. Inclusion of Sasaki and Suzuki-Komatsu**

A patent is invalid for improper inventorship if fewer than the true inventors are named, or if each named inventor did not make a contribution to any one claim in the patent. See *Gemstar-TV Guide Intern., Inc. v. Int’l Trade Com’n*, 383 F.3d 1352, 1381 (2004) (citations omitted). The court’s instructions correctly stated both that “[i]nventorship is determined on a claim-by-claim basis” and that “[a]n individual need have only contributed to the invention of one of the patent’s claims in order to be a named inventor on the patent.” (D.I. 223 at 29-30); see *Gemstar*, 383 F.3d at 1381.

The jury was informed of defendant's contentions that Kida was an inventor of the subject matter of claim 16 of the '856 patent and claims 1, 4, 10 and 20 of the '938 patent and that "Kenichi Sasaki was improperly listed as an inventor because he did not contribute to the subject matter of those claims." (*Id.*)

It was defendant's burden to demonstrate, by clear and convincing evidence, that Sasaki did not contribute to any one of the claims of the patents-in-suit. In this regard, plaintiffs are correct that defendant never presented evidence (at trial or in its opening papers) regarding the inventorship for all of the claims in the patent-in-suit; it focused only on the asserted claims. For this reason alone, the jury's verdict is supported by substantial evidence.

Notwithstanding, Sasaki stated that the inventive contribution of himself, Mitsui and Oyama was the "idea of making  $TiO_x$  targets for high speed deposition," more specifically, using metallic titanium to make a  $TiO_2$  film and speeding up the sputtering process by starting with an oxide so that less oxygen is required. (D.I. 246 at 314:7-20; 317:10-318:21) Sasaki consulted with Mitsui, who was developing an oxygen deficient titanium oxide target, and conducted experiments. (*Id.* at 319:17-25) Both Mitsui and Hayashi testified that Sasaki contributed to film forming (*Id.* at 264:1-24; D.I. 247 at 535:2-6), and the jury may have properly agreed.<sup>7</sup>

Defendant's theory regarding the impropriety of listing Suzuki-Komatsu was not

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<sup>7</sup>This is so despite the fact that Mitsui recalls slightly different contributions from Sasaki (Mitsui stated that Sasaki contributed to sintered  $TiO_x$  targets, plasma sprayed  $TiO_x$  targets, and film forming with  $TiO_x$  targets, while Hayashi stated that Sasaki contributed only to "film forming"). (D.I. 246 at 264:1-25; D.I. 247 at 535:2-6) Mitsui's and Hayashi's testimony was consistent that Sasaki, at a minimum, contributed to film forming with  $TiO_x$  targets.

submitted to the jury. Defendant does not argue any error in that regard in its JMOL papers, but asserts that the error warrants a new trial. (D.I. 234 at 9; D.I. 236 at 8) The court disagrees. While defendant presented evidence that Suzuki-Komatsu did not believe she was an inventor, she testified that she could not recall her contributions. (D.I. 246 at 290:20-291:18 (“I don’t recall for sure” the work done for Kida, or whether she created any targets)) Further, Hayashi testified that Susuki-Komatsu contributed “plasma spray [for] non-TiO<sub>x</sub>.” (D.I. 247 at 535:2-11) Insofar as defendant did not present evidence at trial regarding the non-asserted claims, it could not prove false inventorship based on the improper inclusion of Suzuki-Komatsu.

#### **4. Exclusion of Kida**

It was defendant’s burden to demonstrate, by clear and convincing evidence, that Kida contributed to the subject matter of any of the claims of the ‘856 patent and, therefore, was required to be listed as an inventor of that patent. Defendant focused in this regard on claim 16 of the ‘856 patent or claims 1, 4, 10 and 20 of the ‘938 patent (which claims defendant has labeled the “three inventor claims”). Defendant points to testimony by Mitsui, described above, that Kida: came up with the undercoat claimed in claim 10 of the ‘938 patent (*id.* at 255:2-12); contributed to the disclosure of plasma sprayed TiO<sub>x</sub> targets (*id.* at 264:7-14); and made the first plasma spray target (*id.* at 245:19-246:18). Hayashi testified that Kida did the development work of the spraying materials. (*id.* at 273:24-274:13) Because the court did not limit the disputed “formed on” limitation to a particular application process, claim 16 of the ‘856 patent is not limited to sintered targets, and encompasses the plasma-sprayed targets that defendant

argues were developed by Kida. (D.I. 223 at 18; D.I. 234 at 6) It is defendant's position, based on the foregoing, that Kida was "an indispensable inventor of the claims covering TiO<sub>x</sub> targets generically (i.e., not limited to particular methods like sintering)," and that Kida was only excluded in order to overcome the examiner's rejections based on JP-469. (D.I. 234 at 6)

In response, plaintiffs point to the trial testimony of Mitsui where he confirms that the declarations to the PTO were truthful, wherein Mitsui, Oyama and Sasaki affirmed that they were the only inventors of the "three inventor claims." (D.I. 246 at 268:19-23; PTX-202 at 095-96; DTX-004 at 1613-14) To the extent Mitsui's trial testimony was inconsistent, a credibility determination (i.e., a question of fact on the issue of Kida's inventorship) was presented to the jury. *See Illinois Tool Works, Inc. v. MOC Products Co., Inc.*, — F. Supp. 2d — , 2012 WL 727828 at \*26 (S.D. Cal. Mar. 6, 2012) (holding that signed declarations to the PTO reciting that the signing parties are the only joint inventors, despite testimony from co-inventors to the contrary, created a genuine issue of material fact precluding summary judgment). Likewise, it was for the jury to weigh Hayashi's testimony against the prior sworn statements of Mitsui, Oyama and Sasaki. *Id.* It was permitted to find the declarations, buttressed by Mitsui's trial testimony, to be credible, as was it permissible for the jury to find defendant's evidence did not rise to the level of "clear and convincing."

Therefore, while defendant presented un rebutted trial testimony from Mitsui and Hayashi tending to indicate Kida contributed to the undercoat claimed in claim 10 of the '938 patent, and that Kida contributed to plasma-sprayed targets as encompassed by claim 16 of the '856 patent, the court affirms the findings of the jury. Defendant's motion

for JMOL is denied on this ground.

## **B. Obviousness**

### **1. Standards**

“A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art.” 35 U.S.C. § 103(a). Obviousness is a question of law, which depends on underlying factual inquiries.

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

*KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966)).

“[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR*, 550 U.S. at 418. Likewise, a defendant asserting obviousness in view of a combination of references has the burden to show that a person of ordinary skill in the relevant field had a reason to combine the elements in the manner claimed. *Id.* at 418-19. The Supreme Court has emphasized the need for courts to value “common sense” over “rigid preventative rules” in determining whether a motivation to combine existed. *Id.* at 419-20. “[A]ny need or problem known in the field of endeavor at the time of

invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *Id.* at 420. In addition to showing that a person of ordinary skill in the art would have had reason to attempt to make the composition or device, or carry out the claimed process, a defendant must also demonstrate that “such a person would have had a reasonable expectation of success in doing so.” *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007).

A combination of prior art elements may have been “obvious to try” where there existed “a design need or market pressure to solve a problem and there [were] a finite number of identified, predictable solutions” to it, and the pursuit of the “known options within [a person of ordinary skill in the art’s] technical grasp” leads to the anticipated success. *Id.* at 421. In this circumstance, “the fact that a combination was obvious to try might show that it was obvious under § 103.” *Id.* Federal Circuit precedent has also established that “[s]tructural relationships may provide the requisite motivation or suggestion to modify known compounds to obtain new compounds,” and that particular types of structural similarity can give rise to a case of prima facie obviousness. *Genetics Institute, LLC v. Novartis Vaccines and Diagnostics, Inc.*, 655 F.3d 1291, 1312 (Fed. Cir. 2011) (citing *In re Deuel*, 51 F.3d 1552, 1558 (Fed. Cir. 1995)).

A court is required to consider secondary considerations, or objective indicia of nonobviousness, before reaching an obviousness determination, as a “check against hindsight bias.” See *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1079 (Fed. Cir. Apr. 16, 2012). “Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the



subject matter sought to be patented.” *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966).

“Because patents are presumed to be valid, see 35 U.S.C. § 282, an alleged infringer seeking to invalidate a patent on obviousness grounds must establish its obviousness by facts supported by clear and convincing evidence.” *Kao Corp. v. Unilever U.S., Inc.*, 441 F.3d 963, 968 (Fed. Cir. 2006) (citation omitted). In conjunction with this burden, the Federal Circuit has explained that,

[w]hen no prior art other than that which was considered by the PTO examiner is relied on by the attacker, he has the added burden of overcoming the deference that is due to a qualified government agency presumed to have properly done its job, which includes one or more examiners who are assumed to have some expertise in interpreting the references and to be familiar from their work with the level of skill in the art and whose duty it is to issue only valid patents.

*PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1304 (Fed. Cir. 2008) (quoting *Am. Hoist & Derrick Co. v. Sowa & Sons*, 725 F.2d 1350, 1359 (Fed. Cir. 1984)).

## **2. Overview**

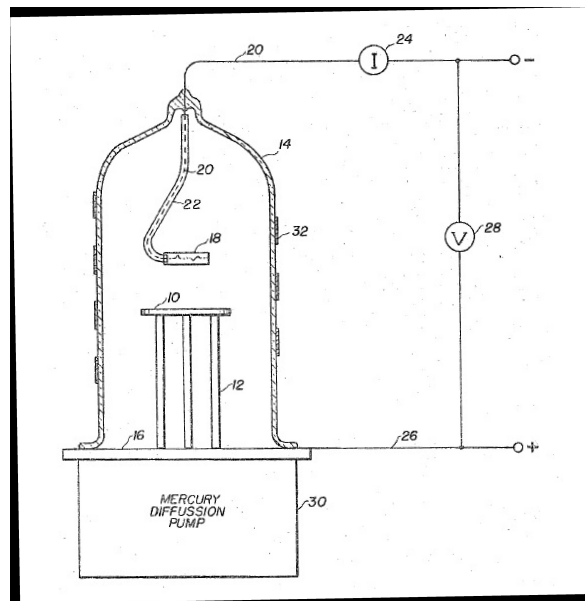
As noted above, defendant presented to the jury fifteen references in connection with its obviousness defense. Post-trial, defendant groups the asserted prior art as follows: Tani, Gillery, Heil and Mitsui “each disclose a  $TiO_x$  sputter target where  $1 < x < 2$ ;” Weigert and Klein “each disclose a metal suboxide (indium tin suboxide) sputter target;” and JP-469, Kida and other references “disclose a substrate for the target material.” (D.I. 234 at 12) Defendant has organized its post-trial arguments by each iteration of plausible obviousness rationales iterated in *KSR*. Although the precise combinations

relied upon by defendant are not a model of clarity,<sup>8</sup> the court will track defendant's brief in laying out its decision, keeping in mind that the jury verdict must be affirmed if it is supported by "relevant evidence from the record taken as a whole" as may be reasonable to support it. *Perkin-Elmer Corp.*, 732 F.2d at 893.

### 3. Claim 16 of the '856 patent and claim 1 of the '938 patent

#### a. "Predictable variation" of prior art

Defendant argues that "there were several known  $\text{TiO}_x$  sputter targets, so implementing a predictable variation on them [to an oxygen deficient oxide] is obvious and not patentable." (D.I. 234 at 15) Defendant focuses on Heil, a 1967 patent showing a  $\text{TiO}_x$  sputter target formed on a substrate. (DTX-528; D.I. 246 at 343:17-344:8) At trial, Horn focused on the following figure of Heil.



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<sup>8</sup>For example, defendant discusses Heil, Gillery, JP-469 and Tani in sequence, then the combination of Gillery, Ohmori, Cass and others, followed by additional references.

(DTX-528) Horn stated as follows:

It's not clear in the figure, but, again, this has to be bonded to the electrical lead. It can't be just hanging out in air. So there is a connection. And so that would imply that this is a substrate and this is the material that's being sputtered, and it's being collected down there on No. 10 (indicating), onto other material. It could have been glass or whatever they were depositing it on.

(D.I. 246 at 344:18-24) The other testimony by Horn cited by defendants with respect to

Heil is as follows.

[A] [cont.] Even in 1967 [Heil] was using sputtering. It was a titanium sub-oxide target. He was forming a film. He was using everything in claim 1 [of the '938 patent] and claim 16 [of the '856 patent] that is described there. This is the circuit. This is the DC sputtering circuit. There is the target. There is the lead coming down. That is sputtered and it forms a film.

[Q]. How do you know that the x value in the target is between one and two?

[A]. [Heil] talks about titanium monoxide and sub-oxide of titanium. So, it talks about two different things. Mono is one. Sub-oxide would refer to something between one and two. So titanium metals in general want to be when they react with oxygen, they want to be at the highest oxidation state. They want to be fully oxidized. If it's a sub-oxide, then it's saying its less than a fully-oxidized state. So the highest valent state of titanium is plus four, oxygen is minus two. So, it wants to be  $TiO_2$ , anything less than that would be a sub-oxide.

[Q]. Did you review any literature or anything like that to suggest what the x value would be?

[A]. In the course of the literature of the patents that I looked at, generally I found that a sub-oxide refers to an x value between one and two.

(*Id.* at 382:4-383:5)

As the foregoing indicates, Horn did not identify the particular basis for his opinion that the sub-oxide of Heil was  $1 < x < 2$  as the claims of the patent-in-suit require. Defendant points to the cross-examination testimony of plaintiffs' technical expert, Dr.

Eugene Olevsky (“Olevsky”), that claim 16 of the ‘856 patent is not limited to a particular application or problem in the art (hysteresis), and that Heil references that its target can be titanium monoxide. While Olevsky admitted that Heil generally references sub-oxides, which “can be  $TiO_x$  with  $x$ , for example, not only equal to one, but even less than one,” Olevsky stated that Heil’s primary target material (as discussed in several locations of the patent) was the monoxide. (D.I. 248 at 715:9-718:24) Still, Olevsky agreed that “sub-oxide” is a broad class that includes sub-oxides where the “ $x$ ” is between one and two. (*Id.* at 715:25-716:2)

While the foregoing is generally supportive of its theory, defendant had the burden of demonstrating obviousness by clear and convincing evidence. The court finds that the jury could have reasonably found that Horn’s cursory testimony on the motivation to modify Heil was insufficient to meet this high burden, and it does not disturb the verdict on this record.

Defendant’s next argument is that Horn’s testimony demonstrated that Gillery, alone, renders the patents-in-suit obvious. (D.I. 234 at 16) The relevant figure of Gillery is provided below.

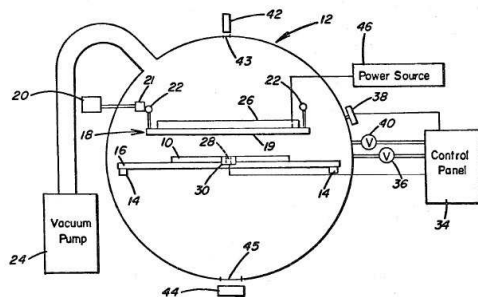


FIG. 2

(DTX-529) In support of its theory, defendant cites the following testimony. First, Horn testified that Gillery's figure 2 shows

a vacuum pump and a vacuum system and here's your power source. And Gillery states clearly in his patent that he's using a D.C. sputtering power source. The power attached here in No. 18 is the target material, and that target material then is sputtered onto glass, which is down here (indicating). And one of the other figures will show you that they were making layers on that glass material.

(D.I. 246 at 346:4-12) Further,

if we look at Gillery in column 9, 58 to 64, he specifically calls out in this part of the patent, he says, while the Article 50, which is the glass that's being sputtered on, was produced with the use of a titanium metal cathode, a titanium oxide, which is only partially oxidized, may also be utilized in the practice of the present invention.

And he goes on to say, that has a benefit. In such a case, smaller oxygen partial pressures are required to maintain the oxidation levels of the layers that they were trying to deposit. So 50 was the substrate and they were putting layers 54 and 58, and that's on Figure 2 of the patent. So, again, it specifically calls out a titanium oxide cathode, which is only partially oxidized.

[Q] So what does that mean for us in terms of this case?

[A] Well, I believe that is another way of saying it's a  $TiO_x$  target.

(*Id.* at 346:17-347:9) Later, Horn explained that "it says the words, a titanium oxide cathode. In other literature, it already defined titanium oxidized in this way as sub-stoichiometric oxide." (*Id.* at 384:6-15) That is, it was Horn's "understanding from general literature reading" that the disclosure of a partially oxidized cathode means a  $TiO_x$  material where  $1 < x < 2$ . (*Id.* at 384:20-385:3) Defendant also cites the cross-examination testimony of Olevsky, who stated that Gillery could be referring to an oxygen-deficient oxide, but that in his opinion, Gillery was more probably talking about a "physical mixture of stoichiometric oxide and metal" based on Gillery's full disclosure.

(D.I. 248 at 720:12-722:15)

As with Heil, the court finds the foregoing could have been reasonably viewed by the jury as insufficient evidence upon which to overcome the presumption of validity of the '856 and '938 patents. Horn did not articulate any particular support for his "general" interpretation of a partially oxidized cathode as  $TiO_x$  material where  $1 < x < 2$ . While Horn was permitted to rely on the knowledge of a person of ordinary skill in the art as support for obviousness, absent more, the jury was reasonable in its conclusion that defendant did not meet its high burden of proof on this record.

Finally, defendant argues the JP-469 renders the patents-in-suit obvious. (D.I. 234 at 17) However, the jury was instructed that it could only consider JP-469 in its obviousness determination if it determined that plaintiffs named the incorrect inventors for claim 16 of the '856 patent and claims 1, 4, 10 and 20 of the '938 patent. (D.I. 223 at 22-23) Insofar as the jury found the patent valid, JP-469 was not considered prior art vis a vis the patents-in-suit, and will not be analyzed post-trial.

**b. "Combining prior art elements according to known techniques to achieve predictable results": Tani**

Under the foregoing heading, defendant asserts that it demonstrated at trial that "Tani, alone, renders several of Asahi's claims obvious, including claim 16 of the '856 patent and claim 1 of the '938 [patent]." (D.I. 234 at 18) The court addresses this argument below.<sup>9</sup>

**(1) Defendant's evidence**

Tani is a Japanese Unexamined Patent Application Publication disclosing "[a]

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<sup>9</sup>The importance of the jury's determination regarding Tani is underscored by the fact that Tani is the primary reference before the PTO in the co-pending reexamination.

method for manufacturing a sputtering target wherein the film can be deposited with a stable and high film deposition rate by performing stable electro-discharge even when sputtering on a target over an extended period of time, without aberrant electro-discharge or cracking of the target occurring during sputtering.” (DTX-501 at abstract) Defendant focuses specifically on “comparative example 3” of Tani. (D.I. 246 at 342:1-24) In this example, Tani discloses utilizing a target made with the process of embodiment 1 for forming a disc target, with the exception of utilizing  $\text{TiO}_2$  powder as the raw material, using hydrogen gas ( $\text{H}_2$ ) as the sintering ambient, and using 1300 degrees C as the sintering temperature. (DTX-501 at [0033]) The resultant target was “ $\text{TiO}_{2-x}$ ”<sup>10</sup> and had an electrical resistance (when measured through the application of 1.5 V) of  $18 \Omega \cdot \text{cm}$ . (*Id.* at [0034]) The target was then used to perform sputtering “to deposit a dielectric film of  $\text{TiO}_2$  ceramic onto the substrate.” (*Id.* at [0035])

The film deposition rate was initially  $220 \text{ \AA}/\text{min}$ ., but the number of aberrant electro-discharges that occurred during the 20 hours of continuous electro-discharge was 11. When the surface of the target was observed after the continuous electro-discharge, several cracks had occurred in a portion of the target.

(*Id.* at [0036])

Defendant highlights Tani’s subsequent disclosure that,

[i]n each exemplary embodiment, Ti powder or Ti powder and Zr powder was used as a raw material powder in the ceramic target, and thus it was confirmed that, at the time of sintering the target, these metal powders were wintered while the surrounding oxide particles or carbonate particles, or both, underwent reduction, to form a state of uniform oxygen deficiency, when compared to the stoichiometric composition of the ceramic, even in the interior of the target, and that, at the time of sputtering, an electropotential can be applied uniformly to the target, and a stable

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<sup>10</sup>There appears to be no dispute that  $\text{TiO}_{2-x}$  is the same as  $\text{TiO}_{2-x}$ ; the court cites the testimony and exhibits as they appear.

electro-discharge was possible, without cracking in the target and without the occurrence of aberrant electro-discharge, even when sputtering was performed over an extended period of time.

(*Id.* at [0047])

Defendant's expert (Horn) testified that Tani disclosed, "in black and white," the creation of "two different targets that were  $\text{TiO}_2$  minus  $x$ , where  $x$  was greater than one and less than two, and it's highly unlikely that  $x$  is less than one or equal or greater than two in these circumstances." (D.I. 246 at 342:18-24) Tani also disclosed "the ability of  $\text{TiO}_2$  powder to be reduced to produce a target that is  $\text{TiO}_x$ ." (*Id.*) According to Horn, Tani's disclosure of a " $\text{TiO}_{2-x}$ " (or  $2-x$ ) target with an electrical resistance of  $100 \text{ m}\Omega\cdot\text{cm}$  "is the same as saying  $\text{TiO}_x$ ." (*Id.* at 347:17-21) The only difference between Tani and claim 16 of the '856 patent is

the material formed on the substrate. The target material has the main component in oxygen deficient oxide. The material [referenced in [0031]] was  $\text{TiO}_x$  where  $x$  was between one and two. So the only difference is using this prior art plus the knowledge of a substrate which was conventional wisdom to a person of ordinary skill in the art would have rendered the claims obvious.

(*Id.* at 386:25-387:7; see also D.I. 248 at 749:1-8) Horn stated that a person of ordinary skill in the art making sputtering targets would look at the success of conductive target of Tani, made of  $\text{TiO}_{2-x}$ , which was uniform throughout and was used in DC sputtering for a period of 20 straight hours. (D.I. 247 at 477:2-9) That's "exactly what's in claim 16 [of the '856 patent]," a sputtering material comprising an oxygen deficient oxide of  $\text{TiO}_x$ , the  $x$  being 1, which is less than 2. (*Id.* at 477:11-14) Mixing "a little bit of metal with it" would yield a " $\text{TiO}_2$  minus  $x$  material." (*Id.* at 477:15-17)

In further support of its theory, defendant also points to documents wherein plaintiffs apparently referred to sputter targets using  $\text{TiO}_x$  and  $\text{TiO}_{2-x}$  interchangeably.



(D.I. 234 at 18) (citing DTX-2; DTX-116; DTX-333) Defendant does not further illuminate the foregoing through expert testimony, but cites trial testimony by Mitsui that  $TiO_x$  and  $TiO_{2-x}$  were used interchangeably in one such document. (*Id.*) (citing D.I. 246 at 243:12-18)

## (2) Plaintiffs' evidence

In their responsive papers, plaintiffs cite the testimony of its expert, Olevsky, who opined on Kodera, Tani and a third reference, unexamined Japanese Patent Application Publication H6-264231 ("Sugihara"),<sup>11</sup> together. (D.I. 237 at 23) Olevsky testified that Kodera, Tani and Sugihara are related to microelectronics, as compared to large scale coating, and do not deal with deposition from metal targets. (D.I. 248 at 668:1-669:16) A person of ordinary skill in the art in 1995 would not have considered the above prior art references to be related to the problems of poisoning and hysteresis (addressed in the patents-in-suit) because they deal with perovskites, or materials with which a metallic target cannot be used. (*Id.*; 677:2-678:12) Kodera, Tani and Sugihara sought to increase conductivity, and suggested the use of titanium targets, not substoichiometric targets, for the purpose of getting rid of hysteresis. (*Id.* at 677:12-678:25)

Olevsky stated that example 3 of Tani suggests taking a titanium and a titanium dioxide powder in a special combination ratio to create a ceramic sputtering target, in a sintering procedure occurring at 1300 degrees C for two hours. (*Id.* at 670:2-13) This high temperature results in some oxygen disassociating from the titanium dioxide,

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<sup>11</sup>(DTX-166 at pg. 166-48 et seq.)

producing two phases in the target: a metallic phase and titanium dioxide phase. (*Id.* at 670:19-671:14) Olevsky testified that this differs from the target of the patents-in-suit, which have one major phase – the substoichiometric phase ( $\text{TiO}_x$  where  $1 < x < 2$ ). (*Id.*)

Because Tani did not provide any information about the analysis of the targets, Olevsky drew information about the resultant target from the Sugihara patent,<sup>12</sup> which used a similar procedure to Tani and published characterizations of the resultant targets. (*Id.* at 671:15-672:19) The Sugihara inventors used “exactly the same mixture” (of titanium dioxide powder) as Tani, and treated the powder at 1200 degrees C, with added external pressure that Olevsky said compensates for the 100 degree C difference from Tani. (*Id.* at 673:7-15; 674:3-675:2) Upon analysis, the titanium dioxide phase was distributed evenly in Sugihara’s targets, meaning that there was a metallic titanium phase and a purely titanium dioxide phase. (673:16-25) Olevsky testified that this result could be expected in Tani, but Tani likely had more of a pure titanium and pure titanium dioxide phase differentiation because of Tani’s heightened process temperature. (*Id.* at 675:1-22) Notwithstanding the foregoing, Tani reported that the target of comparative example 3 “failed” due to “substantial arcing,” and this would teach away from a person of ordinary skill using that target. (*Id.* at 676:3-24)

Plaintiffs also introduced evidence of secondary considerations of nonobviousness. Olevsky testified that simple techniques for the deposition of titanium dioxide on glass existed in the 1950s, however, high frequency sputtering did not occur until the 1970s or 1980s, when the target was made of the same material that was

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<sup>12</sup>(DTX-166)

sought to be deposited. (*Id.* at 592:23-594:4) The move to pure metals (and a direct current, rather than alternating high frequency current) occurred in the 1980s/1990s. (*Id.* at 594:13-595:16) Two textbooks were discussed by Olevsky at trial in this regard, published in 1991 (“Thin Film Processes II”) and 1995 (“Handbook of Optical Properties I”), respectively. (PTX-344; PTX-343) Olevsky illustrated how the 1995 reference taught that artisans seeking to deposit compounds (like metal oxides and nitrides) had two choices: using titanium dioxide with high frequency sputtering; or using pure metallic targets while employing reactive sputtering. (D.I. 247 at 599:12-600:10 (discussing PTX-343)) With metallic mode sputtering, the deposition rate slows by an order of ten due to the buildup of oxide on the target surface (“poisoning”). (D.I. 247 at 600:24-601:17) The 1991 publication was consistent, and also highlighted two advantages for using metal targets over high frequency sputtering using titanium dioxide: high thermal and electrical conductivity (for stabilization) and “high rate techniques” (a “paramount importance for large area [ ] coating”). (*Id.* at 602:10-603:15) In sum, “industry was looking at metal targets as the best solution for this deposition process.” (*Id.* at 603:16-18)

Olevsky testified that plaintiffs’ invention provided a solution to the “long-felt but unmet need” of obtaining a high deposition speed and process stability without poisoning (an oxide layer on the target surface) using sub-stoichiometric  $TiO_x$  targets. (*Id.* at 604:11-606:6) More specifically, the idea of adding oxygen to the process, given that oxygen is a harmful element from the viewpoint of poisoning, “would be considered . . . a disastrous idea.” (*Id.* at 605:21-606:6) Yet, introducing oxygen in the target worked. (*Id.*) Subsequent publications characterized the achieved deposition rate as

“unexpectedly high” (JTX-98) and “surprisingly discovered” (DTX-560). (D.I. 248 at 705:8-25; 701:25-702:15) Plaintiffs introduced several other articles generally demonstrating praise for the inventions of the patents-in-suit. (*Id.* at 700:22-701:16 (discussing JTX-157); *id.* at 704:3-17 (discussing JTX-155); *id.* at 698:10-699:5 (discussing JTX-153); *id.* at 695:19-696:16 (discussing PTX-383)) Defendant and other companies in the industry switched to using TiO<sub>x</sub> targets in about 2002. (D.I. 245 at 176:5-11)

### (3) Analysis

Defendant had the burden of proving obviousness in view of Tani by clear and convincing evidence. Defendant admits that Tani does not disclose the claimed substrate, but that this feature would have been “inherent” or obvious. (D.I. 234 at 19) Horn broadly supports this proposition by stating that doing so would have been in line with “conventional wisdom” in the art, without providing any more specific rationale. (*Id.* (citing 386-87; 339-43; 749)) See *KSR*, 550 U.S. at 418 (“[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.”). Defendant does not point to particular testimony tending to establish that the claimed inventions were no more than predictable variations of Tani or that the teachings of Tani led to the discovery of the patented inventions in the ordinary course. (D.I. 234 at 18-19; D.I. 241 at 11) See *KSR*, 550 U.S. at 419. Nor does defendant point to evidence rebutting plaintiffs’ secondary considerations of nonobviousness in its reply papers. (D.I. 241 at 12-15) On this record, and insofar as the jury could have reasonably credited the

testimony of Olevsky over Horn,<sup>13</sup> the court does not disturb the jury's verdict of validity. Defendant's motion for JMOL is denied on this ground.<sup>14</sup>

**c. "Simple substitution of one known element for another to obtain predictable results"**

Defendant argues that, "[g]iven the teachings of Klein and Weigert regarding the benefits of one known metal sub-oxide, ITO<sub>x</sub>, it would have been obvious to substitute TiO<sub>x</sub> for ITO<sub>x</sub> to get a TiOx sputter target." (D.I. 234 at 20) In support, defendant cites testimony by several witnesses that ITO and TiO<sub>2</sub> were commonly used together in the glass industry. (*Id.*) Notwithstanding, defendant cites no testimony supporting its statements that a "simple substitution of TiO<sub>x</sub> material in place of sub-stoichiometric ITO to obtain TiO<sub>2</sub> targets would have been obvious," or that it would have been obvious to try TiO<sub>x</sub> targets. (*Id.*) The chemical arts have long been acknowledged to be unpredictable,<sup>15</sup> and the jury could have reasonably found that defendant did not prove obviousness on this record.

Defendant also argues that Kida, which shows how to make ceramic targets using plasma spraying on an undercoat, could be modified with a "TiO<sub>x</sub> powder in his

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<sup>13</sup>Plaintiffs point out in their responsive papers that Horn testified that he has never conducted research in the area of large scale glass coatings nor consulted in this area outside of this lawsuit. Horn supervised students making sputtering targets, but has not made any himself. (D.I. 246 at 422:17-425:17)

<sup>14</sup>The court declines to address defendant's remaining argument in this section, which cursorily asserts that Gillery combined with Ohmori, Cass "and others" renders claim 16 of the '856 patent and claim 1 of the '938 patent obvious, such "others" including Hoechst, Hayfield, Weigert and Klein. (D.I. 234 at 19)

<sup>15</sup>See, e.g., *Procter & Gamble Co. v. Teva Pharmaceuticals USA, Inc.*, 566 F.3d 989, 996 (Fed. Cir. 2009) (quoting *Eisai Co. Ltd. v. Dr. Reddy's Labs., Ltd.*, 533 F.3d 1353, 1359 (Fed. Cir. 2008)).

plasma spraying method such as that taught by Hoschst or Omori.” (D.I. 234 at 20) Defendant further argues that “a person of ordinary skill would consider sintering TiO<sub>2</sub> powder like those taught by Hayfield or Cass instead of the more complicated mixtures that Kida uses to produce a conductive TiO<sub>x</sub> target.” (*Id.*) In neither instance did defendant cite expert (or other) testimony describing a motivation to make such alterations. (*Id.* at 20-21) For the reasons articulated above, the court does not disturb the verdict on these grounds.

**d. “Using a known technique to improve similar devices in the same way”**

Under this heading, defendant argues that “a person of ordinary skill could also have used the reducing techniques of Ohmori to improve Kida, especially given the suggestion of Klein and Weigert, who discuss the benefits of metal sub-oxide targets, and also a technique for creating them.” (D.I. 234 at 21) (internal citations omitted) As its lone support for the proposition that there would have been a motivation to use the teachings of these indium tin sub-oxide references with other metal oxide targets, defendant cites only the testimony of Hayashi, stating that it was “common sense” to use plasma spraying to reduce metal oxide powders. (*Id.* (citing D.I. 246 at 274:25-275:15)) Hayashi’s testimony is extremely general and does not address any of the asserted references specifically, let alone any motivation to combine or modify them in the manner asserted. As such, the court does not disturb the jury’s verdict of nonobviousness on this ground.

**e. “Obvious to try”**

In this section of its papers, defendant argues that “Klein and Weigert teach

many benefits of using a metal suboxide sputter target including high film forming speed DC sputtering for coating large area substrates.” (D.I. 234 at 22) (internal citations omitted) Further, it would have been obvious to try a  $TiO_x$  target to increase the sputtering speed in view of Heil, Gillery, Tani and Mitsui, and it would have been “obvious to try the reducing techniques in Ohmori and Cass given Sakurai and Kida in view of the impetus in Klein and Weigert.” (*Id.*) Defendant does not offer support in the record for such “kitchen sink” theories, and the court does not address them further.

**f. “Known to work in one field of endeavor” prompting predictable variations in another**

Defendant argues that “[t]he work in the field of developing sub-stoichiometric, electrically conducting ceramic electrodes of  $TiO_x$  was well-known from Hayfield, Cass, Ohmori and Hoechst.” (*Id.*) (internal citations omitted) “Given the problems of using metal titanium targets in a difficult to control reactive sputter process – noted by Kodera [–] this would provide incentive for a person of ordinary skill to try these  $TiO_x$  materials as sputter targets[.]” (*Id.*) Insofar as no expert specifically opined that this is so, the court does not disturb the verdict on this ground.

**g. “Some teaching, suggestion or motivation in the prior art” that would motivate ordinary artisans to arrive at the patented invention**

Defendant’s final theory is “that the background sections of Klein and Weigert provided a motivation to move away from reactively sputtered metal targets and use conductive ceramic metal sub-oxide targets for high film-forming speed applications for large area substrates[.]” (D.I. 234 at 23) In this regard, defendant cites Horn’s conclusory testimony to this effect, concluding with his opinion that these teachings

would have motivated a skilled artisan “to arrive at the claimed invention.” (*Id.* (citing D.I. 246 at 399:10-400:17)) Horn’s cited testimony did not illuminate his rationale to any further degree. Absent more, the court does not disturb the jury verdict. Insofar as this is the only theory for which defendant proffers testimonial support, the court ends its analysis here.

#### **4. Claim 10 of the ‘938 patent**

The last remaining ground of obviousness asserted by defendant concerns claim 10 of the ‘938 patent, which further requires an undercoat between the substrate and the target material. Insofar as defendant incorporates its previous arguments with respect to claim 1 of the ‘938 patent for claim 10, the court does not find claim 10 obvious on any of the previously-addressed rationales. (D.I. 234 at 24) Defendant further argues, with respect to claim 10, that Kida discloses a metal or alloy “undercoat” and, therefore, “provides an express motivation for using the technique of forming the target material on a substrate over an undercoat. (*Id.* at 24-25) Defendant also states that Hyllberg discloses “plasma spraying a  $TiO_x$  material on a cylindrical substrate over a bonding layer of the same material as that used by Kida for an undercoat.” (*Id.* at 25) No testimony (by an expert or otherwise) is cited by defendant in support of these propositions. The court declines to overturn the verdict based on attorney argument, and defendant’s motion is denied on this ground.<sup>16</sup>

#### **5. Conclusion on obviousness**

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<sup>16</sup>The court need not address defendant’s remaining arguments with respect to the dependant claims, given that the most broad claims have not been proven to be obvious.



Based on the foregoing, the court finds that defendant has not identified clear and convincing evidence of obviousness of the asserted claims of the patents-in-suit. Plaintiffs' evidence of secondary considerations of nonobviousness discussed in section IV.B.3(b)(3), *supra*, provides further rationale for upholding the jury verdict of nonobviousness based on the additional references and combinations of references asserted by defendant. Outside of Tani, the majority of defendant's additional obviousness theories were founded primarily on attorney argument. The court concludes that the jury's verdict of nonobviousness was reasonable and supported by the record.

### **C. New Trial**

Defendant moves for a new trial based on five grounds: (1) the court's inventorship instructions were in error, as was (2) the instruction regarding JP-469; (3) the court failed to submit the Suzuki-Komatsu inventorship question to the jury; (4) the court improperly excluded defendant's anticipation defense; and (5) the obviousness verdict was against the weight of the evidence. (D.I. 236) The court has addressed issues (1) and (3), *supra*. Moreover, in accordance with its analysis of defendant's obviousness defense, the court does not find that the jury's verdict of nonobviousness is against the weight of the evidence.

With respect to the court's instruction to the jury that JP-469 could only be considered prior art if the jury found that plaintiffs "named the incorrect inventors for claim 16 of the '856 patent and claims 1, 4, 10 and 20 of the '938 patent,"<sup>17</sup> defendant

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<sup>17</sup>"[I]f [plaintiffs] named the correct inventors for [these] claims, the inventors' own prior publications cannot be used to invalidate their patent." (D.I. 223 at 22-23)

argues that it was prejudiced because the jury was not in a position to find invalidity in view of JP-469 for claims 3, 7, 8, 9, 11, 18-19 and 25 of the '938 patent. (D.I. 236 at 7) Relatedly, defendant argues that it was plaintiffs' burden to show that the "non-three-inventor claims are entitled to a date of invention earlier than the filing date" of the patents-in-suit. (*Id.* at 5-6)

Defendant does not contend that it presented evidence that JP-469 invalidates claims 11, 18 or 25 of the '938 patent. (*Id.* at 7) With respect to claim 3, defendant points to testimony linking JP-469 to a resistivity of less than 10  $\Omega$ -cm, but this testimony was not connected or related to claim 3 for the jury's benefit. (D.I. 246 at 404:11-22) Defendant points only to Horn's conclusory statement of obviousness of dependent claim 19, which comments do not mention JP-469. (*Id.* at 409:21-410:3) ("I've already shown in the other [claims] that there was plenty of prior art that showed low resistivity in materials"). A similar pattern follows for claims 7 and 8. (*Id.* at 405:24-407:9 ("Many of the references that I've showed and we've read over the last couple of hours talk about sputtering in argon plus oxygen," exemplifying Tani and Kida)); *id.* at 406:21-407:9 (Tani, Mitsui and Gillery render obvious the limitation of carrying out sputtering in argon plus oxygen where oxygen is less than 30%)) Horn also testified that he understood "that [JP-469] may be considered prior art for certain claims, especially if Mitsui, Suzuki[-Komatsu] and Oyama are not the sole inventors for some of the claims." (*Id.* at 348:12-15) Horn did not testify that, if inventorship is incorrect, JP-469 could be prior art for all asserted claims. In short, the court does not discern an error in its instruction; if it had, however, such error would have been harmless given the record at bar.

Finally, the court excluded defendant's anticipation defense after giving it ample opportunity to demonstrate that Horn (or another expert) performed the required limitation-by-limitation invalidity analysis. (D.I. 185; D.I. 191) The court discerns no error in its holding that defendant's evidence was legally insufficient. With respect to defendant's assertion that expert testimony was not required, the court disagrees. See *Centricut, LLC v. Esab Group, Inc.*, 390 F.3d 1361, 1369 (Fed. Cir. 2004) (expert testimony is needed where the technology is not "easily understandable") (citation omitted); see also *Oxford Gene Tech. Ltd.*, 345 F. Supp. 2d at 435-37.

#### **D. Inequitable Conduct**

##### **1. Standards**

The Federal Circuit has recently stated that,

[t]o successfully prove inequitable conduct, the accused infringer must provide evidence that the applicant (1) made an affirmative misrepresentation of material fact, failed to disclose material information, or submitted false material information, and (2) did so with intent to deceive the PTO. Both materiality and intent must be proven by clear and convincing evidence. While deceptive intent can be inferred from indirect and circumstantial evidence, that inference must not only be based on sufficient evidence and be reasonable in light of that evidence, but it must also be the single most reasonable inference able to be drawn from the evidence to meet the clear and convincing standard.

*Cancer Research Technology Ltd. v. Barr Laboratories, Inc.*, 625 F.3d 724, 732 (Fed. Cir. 2010) (internal quotations and citations omitted). The court must recognize that "materiality and intent are separate requirements, and intent to deceive cannot be found based on materiality alone." *Id.* (citing *Larson Mfg. Co. of S.D., Inc. v. Aluminart Prods. Ltd.*, 559 F.3d 1317, 1340 (Fed. Cir. 2009)). The court cannot simply infer that an applicant "should have known" the materiality of the withheld information; other

evidence “that indicates that the applicant appreciated the information’s materiality” is required. *Id.* (citation omitted).

## **2. Ando and Makino**

Defendant asserts that inventor Mitsui committed inequitable conduct by withholding two of plaintiffs’ patents, the Ando and Makino patents noted *supra*, during prosecution of the ‘856 patent. It is defendant’s position that Ando and Makino anticipate or render obvious claims 1, 5, 9 and 10 of the ‘856 patent and, had inventor Mitsui disclosed this prior art to the PTO, the examiner would not have allowed these claims to issue. (D.I. 239 at 4) Plaintiffs concede that neither reference was disclosed to the PTO.

Defendant argues that Mitsui was aware of Makino because he is a named inventor on that patent, and was aware of Ando because it is a parent application to Makino and has a “significant overlap in the named inventors.” (D.I. 239 at 2) Defendant focuses on a passage of Makino discussing the use of a target “composed of a partially oxidized substance,” such as a zirconium oxide with metal zirconium, “to form a transparent film under a stabilized condition at a high speed.” (*Id.* at 2-3; DTX-536) In support, defendant cites to two pages of transcript from Horn’s cross-examination, in which Horn stated that this passage refers to a stoichiometric substance. (D.I. 239 at 3 (citing D.I. 247 at 461-62))

Defendant also points to testimony elicited on cross-examination by plaintiffs’ expert, Olevsky, regarding the disclosure of the Gillery patent. (D.I. 248 at 721:13-722:12) (discussing the meaning of “partially oxidized” as used in Gillery) Defendant directs the court to Horn’s testimony on the Gillery reference. (D.I. 246 at 347:5-9

(disclosure of a titanium oxide cathode is akin to a  $TiO_x$  target); *id.* at 384:22-385:1 (references discussing a “partially oxidized cathode” are talking about “a  $TiO_x$  material where x is greater than one and less than two”)) None of this testimony relates specifically to Ando ‘637 or Makino ‘835.

With respect to intent, defendant cites Mitsui’s declarations stating that he recognized his duty to disclose, and (pre-trial) deposition testimony to this same effect. (D.I. 239 at 6-7) Defendant also states that Mitsui prepared reports and memoranda during prosecution of the ‘856 patent that coincide with plaintiffs’ response to office actions. (*Id.* at 7)

As the foregoing indicates, defendant’s inequitable conduct argument is based primarily on attorney argument without relevant references in the trial record. The evidence at bar is insufficient to demonstrate either the materiality of Ando and Makino or Mitsui’s intent to deceive the PTO by clear and convincing evidence.

### **3. Costs**

Defendant briefed two additional theories of inequitable conduct to the court post-trial: (1) misrepresentations to the PTO concerning inventorship, addressed *supra*; and (2) misleading the examiner regarding its entitlement to claim priority to the JP-074 application. (D.I. 239) Defendant’s second theory was excluded from this case when the court denied defendant’s motion to amend its counterclaims. (D.I. 174) Defendant does not dispute that the third theory is new to this case, but argues that it is permitted to pursue it insofar as inventor Yasuhara Takeda admitted on cross examination that the patents-in-suit were not entitled to claim priority to JP-074. (D.I. 244 at 13-15) Defendant did not previously seek leave to add this issue to the case, nor would it have

been appropriate to do so given the court's prior ruling denying defendant's motion to amend.

In its responsive papers, plaintiffs request that the court order defendant to pay their costs in responding to the majority of defendant's motion. (D.I. 243 at 8) On December 20, 2011, this issue was addressed by the court in response to plaintiffs' email request seeking to limit their response to defendant's opening brief. (D.I. 240) The court declined to address the issue via email, but warned that defendant "may incur the costs of [plaintiffs'] response, if the court determines either that such grounds were procedurally barred or frivolous." (*Id.*) Insofar as the court agrees with plaintiffs that these theories were procedurally barred, and given that defendant's inequitable conduct theory with respect to Ando and Makino are devoid of merit, the court will order defendant to pay plaintiffs' reasonable costs associated with preparation of their responsive brief.

## **V. CONCLUSION**

For the foregoing reasons, the court denies as moot the parties' Rule 50(a) motions (D.I. 218; D.I. 228); denies defendant's motion for JMOL (D.I. 233); denies defendant's motion for a new trial (D.I. 235); and will order defendant to pay plaintiffs' costs in preparing and filing their responsive brief on inequitable conduct. An appropriate order shall issue.