United States District Court,
D. Delaware.

EMI GROUP NORTH AMERICA, INC,
Plaintiff.
v.
CYPRESS SEMICONDUCTOR CORPORATION,
Defendant.

No. Civ.A. 98-350RRM

Sept. 30, 1999.

Owner of patents for semiconductor chip fuse using optically absorptive layer sued competitor for infringement. The District Court, McKelvie, J., construed claims.

Claims construed

Construed.

Donald F. Parsons, Jr., Colm F. Connolly, Mona A. Lee, Morris, Nichols, Arsht & Tunnell, Wilmington, Delaware, James P. Bradley, Dale B. Nixon, Kathi A. Cover, William D. McSpadden, Matthew D. Jones, Sidley & Austin, Dallas, Texas, Ivan S. Kavrukov, Cooper & Dunham, L.L.P., New York City, for plaintiff.

Josy W. Ingersoll, John W. Shaw, Young, Conaway, Stargatt & Taylor, Wilmington, Delaware, C. Randall Bain, Timothy J. Franks, C. Mark Kittredge, Roger A. Denning, Jay T. Stewart, Brown & Bain, P.A., Phoenix, Arizona, for defendant.

OPINION

McKELVIE**, District Judge.**

This is a patent case. Plaintiff EMI Group North America, Inc. is a Delaware corporation with its principal place of business in Wilmington, Delaware. EMI is the owner of U.S.Patent Nos. 4,355,377 (the '377 patent); 4,826,785 (the '785 patent); 4,935,801 (the '801 patent); and Reissue Patent 35,154 (the '154 reissue patent). Defendant Cypress Semiconductor Corporation is a Delaware corporation with its principal place of business in San Jose, California.

On June 18, 1998, EMI filed a complaint alleging that Cypress infringes one or more claims of the '377 patent and the '154 reissue patent. EMI filed an amended complaint on July 15, 1998, asserting claims of infringement of the '785 patent and the '801 patent. On July 29, 1998, Cypress filed its answer denying

infringement and asserting affirmative defenses of invalidity and/or unenforceability of EMI's patents. On February 22, 1999, the parties stipulated to the dismissal of EMI's claims against Cypress for infringement of the '377 patent and the '154 reissue patent, leaving at issue claims of infringement of the '785 and the '801 patents. The case is scheduled for a two-week jury trial beginning October 18, 1999.

On September 13-14, 1999, the court held a trial in accordance with Markman v. Westview Instruments, Inc., 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996), to construe disputed claims of the '785 and '801 patents. This is the court's construction of those disputed claims.

I. *FACTUAL AND PROCEDURAL BACKGROUND*

The court draws the following facts from the complaint, the patents at issue, the prosecution history of those patents, and a chemical dictionary.

A. *The '785 and* '801 Patents

On May 2, 1989, the U.S.Patent and Trademark Office (PTO) issued the '785 patent. The patent is entitled "Metallic Fuse with Optically Absorptive Layer." The inventors are Paul J. McClure and Robert E. Jones, Jr, and the assignee is INMOS Corporation. On June 19, 1990, the PTO issued the '801 patent, naming the same inventors and assignee. On May 23, 1988, INMOS Corporation changed its name to Thorn EMI North America, Inc., which on August 21, 1996 changed its name to EMI Group North America, Inc., the plaintiff in this action.

The '785 and '801 patents describe the same technology. The '785 patent claims a method for practicing the invention, and the '801 patent claims an apparatus. The patents relate to fuses for disconnecting dysfunctional circuitry in semiconductor chips. Semiconductor chips commonly contain redundant circuitry, such that if any part of the circuitry is defective, it can be disconnected and the redundant circuitry can take its place. The defective circuitry is disconnected by severing the portion of the metal interconnect that links it with the remainder of the circuitry. The portion of the metal interconnect designed to be severed to effect this substitution of circuitry is called a "fuse." One way to sever a fuse is to focus a laser beam on the fuse, irradiating it with the laser's energy until the fuse is severed.

The method and apparatus claims at issue relate to a layered fuse designed to improve the ability of laser beams to sever the fuse material. In the preferred embodiment, as described in the patents at issue, the fuse is formed upon an insulating dielectric layer, which resides upon a substrate. A conductive metal interconnect layer, which connects the redundant circuitry to the remainder of the chip, is formed above the dielectric layer. The metal interconnect is made of aluminum or an aluminum alloy. These metals reflect laser light, and so a high power laser pulse is needed to sever a bare aluminum interconnect.Because strong laser pulses may damage the remainder of the chip, it is desirable to modify the fuse to better absorb the laser light. To this end, the patents in question teach the use of a layer of an optically absorptive transition metal, such as titanium, tungsten, tantalum, or molybdenum, on top of the interconnect. An insulating glass passivation layer encases the structure. The transition metal, when exposed to a lower power laser, absorbs the energy and transmits it to the interconnect. By a process whose details form the crux of this dispute, the aluminum layer heats up and causes the fuse to rupture, severing the connection between the redundant circuitry and the remainder of the chip.

B. *The Prosecution History*

The court interprets ambiguous claims of the patents in light of the specification and the prosecution history. *See* Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed.Cir.1995) (in banc). In particular, analysis of the prosecution history is relevant to resolve the following ambiguities: (1) whether claims 1 and 9 of the '785 patent, which recite the use of an optically absorptive metal, refer to the use of an alloy; (2) whether claim 1 of the '785 patent, which recites the use of a "cap to prevent evaporation" requires that the cap prevent all significant evaporation from the fuse portion; (3) whether claim 1 of the '785 patent, which recites an "explosive removal" of the fuse, permits forces other than vapor buildup to contribute to the explosion; (4) whether the term "exposed," as referred to in claim 17 of the '785 patent, means that the absorptive layer is exposed to laser light or is exposed by etching away the overlying passivation layer; (5) whether the term "causes said lower layer to vaporize," as recited in claim 1 of the '801 patent, requires that the lower layer totally vaporize; and (6) whether the term "disconnecting the previously joined elements," as recited in claim 1 of the '801 patent, requires that the explosion totally disconnect the circuit.

1. ***Prosecution History of*** the '785 Patent

a. ***Claim 1***

i. ***The application***

On January 27, 1987, inventors Paul J. McClure and Robert E. Jones, Jr. applied for a patent for a metallic fuse with an optically absorptive layer. In the summary of the invention, the inventors described the materials that can be used for the interconnect and for the optically absorptive layers. The inventors specified the use of a metal for the interconnect, and recommended the use of aluminum or an aluminum alloy as a preferred embodiment. The application states that "transition metals" are the preferred material for the absorptive layer, particularly the refractory transition metals. The detailed description of the preferred embodiment states that "[o]f the refractory metals, titanium, tantalum, molybdenum and tungsten are the preferred materials for [the] absorptive layer.... In the preferred imbodiment, [the] absorptive ... layer is titanium."

The original claim language disclosing the interconnect was not altered during prosecution. The claim language for the absorptive layer, however, is broader in the initial application than in the final claim. It did not specify a material for the absorptive layer. In full, claim 1 of the application reads:

A method of fabricating on a substrate surface a fuse forming an integral part of a metallic interconnect line joining elements in an integrated circuit, the method comprising:

forming a metal interconnect layer above the substrate surface;

forming a layer of optically absorptive material above said metal interconnect layer;

defining said metal interconnect layer and said optically absorptive material layer into a patterned metallic interconnectfor the integrated circuit including a fuse portion therein.

In the detailed description of the preferred embodiment, the applicants discussed the mechanism by which the fuse explodes. They state that the energy from the laser light causes the interconnect to heat up and eventually melt. The metal "begins to evaporate," such that the vapor pressure builds and causes the melted

fuse material to be removed explosively. The applicants disclosed that the absorptive layer acts as a cap "to prevent evaporation until the vapor pressure of the fuse material contained below the cap is very high." Such a buildup "results in a explosive reaction" and thereby produces an open electrical path.

ii. *The first rejection*

On March 29, 1988, the PTO rejected claim 1, in addition to other claims of the application. The examiner stated that the claim was anticipated under 35 U.S.C. s. 102(b) by the prior art references of either Hishioka or Nagakubo. FN1 The examiner wrote that these references each teach substantially the process claimed by McClure and Jones including the use of optically absorptive layers in fuse technology. The examiner noted that the references do not teach the materials specified by the applicants.

FN1. 35 U.S.C. s. 102(b) provides that a person shall be entitled to a patent unless-

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The examiner found that combinations of other references also teach the claimed invention. The claimed structure, the examiner wrote, is taught by Dalal. This structure, in light of the processes of either Hishioka or Nagakubo, rendered the claimed invention obvious. The examiner, moreover, stated that the combination of references is obvious since Morita teaches the utility of refractory metals in fuse fabrication.

The examiner also rejected the application under s. 112 for lack of enablement and/or failure to give the best mode. FN2 The examiner stated that "[i]t is well known that titanium, tungsten, tantalum, and molybdenum are all highly reflective in their pure unoxidized state." As such, the examiner reasoned, a workable device would require further processing steps not disclosed in the application to make the materials optically absorptive.

FN2. 35 U.S.C. s. 112 provides, in pertinent part:

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

iii. *Amendment A*

On January 27, 1987, the applicants submitted an amendment, Amendment A, to the PTO. The applicants therein contested the PTO's bases for its rejections. In particular, the applicants rebutted the examiner's statement that pure transition metals are highly reflective, and therefore insufficiently absorptive. The applicants stated that "titanium, tungsten, tantalum and molybdenum are optically absorptive metals, especially in relation to aluminum." The applicants discussed the physical properties of titanium that render it sufficiently absorptive to enable the claimed invention. They stated "[t]herefore, no further processing steps need be taken to prepare the materials optically absorptive."

The applicants amended their claims. In particular, in claim 1 and in all claims describing the absorptive layer, they narrowed the phrase "forming a layer of optically absorptive material" to read "forming a layer of optically absorptive metal."

iv. *The second rejection*

On October 26, 1988, the PTO sent the inventors a final action letter rejecting all pending claims. The examiner rejected the claims under s. 103 as unpatentable over either Hishioka or Nagakubo taken with Dalal and Morita. The examiner rebutted the inventors' attempt to distinguish their invention from the prior art by using different materials for the absorptive layer. The examiner wrote that "even the use of a novel starting material would not necessarily render the process patentable." Noting that Morita employs molybdenum in a laser cutting process, the examiner ruled that the inventors' use of that metal is an obvious alternative to the carbon layer disclosed by Nagakubo.

The examiner withdrew his s. 112 rejection. He noted that although the prior art teaches that molybdenum is reflective, it is presumably less so than aluminum alone.

v. *Proposed Amendment B*

On November 30, 1988, the inventors submitted a proposed amendment, Amendment B, in response to the Final Rejection. The purpose of the proposed amendment, as stated in the submission, was to focus more on the properties of the absorptive layer. This amendment restricted the scope of claim 1 to "using an optically absorptive refractory transition metal having a higher boiling point than the interconnect beneath it so that the refractory metal forms a cap." The applicants, describing the mechanism by which the fuse is blown, stated that when a laser is directed at the fuse, "the cap transfers the heat or energy that is absorbed from the directed energy source to the underlying material and permits a vapor pressure under the cap to accumulate." Because the cap melts at a higher temperature than the interconnect, the applicants explained, "eventually there will be an explosive removal of the fuse portion."

The applicants disputed the examiner's contention that Dalal taught the structure of the claimed invention. The applicants acknowledged that Dalal taught the use of a metallic upper layer, which was disclosed as comprising pure metals, such as titanium or tungsten, or alloys such as chrome. Nonetheless, the applicants argued, Dalal did not teach "using such a structure as a fuse which has the unique property of exploding when subjected to a directed energy source."

The applicants emphasized the use of a vapor-induced rupture mechanism to distinguish their claimed invention from prior art fuses. The applicants noted that in Nagakubo, the upper layer of carbon "does not operate as a cap to cause increased vapor pressure until an explosion occurs." The applicants stated that the art of record "generally calls for melting the fuse material, and nowhere is seen to suggest building up an explosive vapor pressure under a cap in a semiconductor integrated circuit."

Claim 1, as submitted in Proposed Amendment B, reads as follows, with the underlining and brackets indicating added and retracted language, respectively:

A method of fabricating on a substrate surface a fuse forming an integral part of a metallic interconnect line joining elements in an integrated circuit, the method comprising:

forming a metal interconnect layer above the substrate surface;

forming a layer of an optically absorptive *refractory transition* metal above said metal interconnect layer, said refractory metal having a *higher boiling point than said metal interconnect layer;*

defining said metal interconnect layer and said optically absorptive [material] layer into a patterned metallic interconnect for the integrated circuit including a fuse portion therein, *said refractory metal forming a cap to prevent evaporation of said fuse portion when said fuse portion is exposed to a directed energy source to increase the vapor pressure under the cap to produce an explosive removal of said fuse portion; and*

removing said fuse portion from said interconnect line by exposing said opticallyabsorptive refractory metal to a directed energy source that explosively removes said fuse portion without damaging the substrate.

vi. ***Notice of Allowability***

On December 12, 1988, the PTO allowed numerous claims of the application, including claim 1. The examiner stated that he allowed the claims because "[t]he ability of the refractory metal to prevent evaporation of the underlying metal and cause explosive removal is an unexpected result which is not taught or suggested by the prior art."

b. ***Claim 17***

Claim 17, originally numbered claim 20, remained unaltered throughout prosecution. It is dependent on claim 1, and recites the method of "directing a laser light on said exposed optically absorptive layer." Claim 1 does not recite the term "exposed." The term "exposed" is used in other claims of the application in two contexts: "exposed" to laser light, and "exposed" when the overlying passivation layer is etched away.

2. ***Prosecution History of*** the '801 Patent***: Claim 1***

a. ***The application***

On January 30, 1989, McClure and Jones submitted an application for a divisional patent of the '785 patent, entitled "Metallic Fuse with Optically Absorptive Layer." The claims in the application that were issued in the '801 patent are apparatus claims, with claim 22 of the application eventually becoming claim 1 of the '801 patent. Claim 22 of the application, in full, reads:

A fuse for a metallic interconnect line that joins elements of an integrate circuit formed on and in a silicon substrate wherein the fuse comprises:

a layered interconnect structure having an upper layer of an optically absorptive material and a layer of metal below said optically absorptive material, said optically absorptive material having a higher boiling temperature than that of said metal layer, the structure being configured such that a laser light directed on said optically absorptive layer is absorbed thereby and causes said metal layer to melt.

b. ***The first rejection***

On August 9, 1989, the PTO rejected the applicants' apparatus claims. Claim 22, the examiner wrote, was vague and indefinite, as well as obvious in light of Jones and Katto. The examiner noted that these references disclosed the use of polycrystalline or amorphous silicon materials as suitable for an absorptive layer, and that "it would have been obvious to have used other well known conductive materials" for the absorptive layer. The examiner also found the claim obvious under Takagi, which taught the use of laser beams in conjunction with two-layer fuses. The examiner wrote that, in light of Takagi's disclosure that laser energy is absorbed by the fuse, "it would have been recognized that the upper layer ... absorbs laser radiation

and causes [the] first layer ... to melt."

c. ***Amendment A***

On November 3, 1989, the applicants submitted Amendment A to the PTO. The applicants therein challenged the examiner's obviousness rejections. The applicants distinguished Takagi from the claimed invention by writing "Takagi uses a metal silicide, not a transition metal for the upper layer." As such, the applicants stated that it would not be obvious "to use an upper layer of a transition metal."

The applicants further attempted to overcome obviousness rejections by asserting that the interconnect in the claimed invention boils. In contrast to other art, such as North, which merely disclose the melting properties of metals, the applicants stated that their invention "relies on the lower level boiling before the upper level, causing an explosion which completely removes the fuse material." Moreover, they wrote that neither North nor Jones "suggests a combination of aluminum in a sandwich structure which is designed to absorb energy in an upper layer causing the lower layer to boil first and explode."

The applicants, in light of these contentions, amended their claims. Claim 22 was amended to become claim 1, and reads:

A fuse for a metallic interconnect line that joins elements of an integrated circuit formed on and in a silicon substrate wherein the fuse comprises:

a layered interconnect structure having an upper layer of an optically absorptive material and a *lower* layer of metal below said *upper* layer [optically absorptive material], said optically absorptive material having a higher boiling temperature than that of said metal [layer], *said upper layer forming an explosion-inducing cap,* [the] *said layered interconnect* configured such that a laser light directed on said [optically absorptive] *upper* layer is absorbed thereby and causes said [metal] *lower* layer to [melt] *boil before said upper layer melts thereby inducing an explosion which substantially removes said layered interconnect structure, disconnecting the previously joined elements of the integrated circuit.*

d. ***Final rejection***

On January 9, 1998, the examiner entered a final rejection for all claims except claim 27. The examiner disallowed claim 22, and its dependent claims, because the claim language "causes said lower layer to boil before said upper layer melts" was inconsistent with the specification as originally disclosed. The examiner also rejected the claims under s. 112 for failure to particularly point out and distinctly claim the subject matter which the applicants regard as the invention.

e. ***Examiner Interview***

On January 16, 1990, the examiner conducted a brief interview with the inventors. In response to this interview, the examiner agreed to allow the claims upon restriction of their scope to vaporization of the interconnect. As amended, the pertinent part of claim 22 reads: "causes said lower layer to vaporize before said upper layer vaporizes."

II. ***DISCUSSION***

A. ***Basic Principles of Claim Construction***

[1] [2] [3] Claim construction is a matter for the court. Markman, 52 F.3d at 979. Claims are construed from the vantage point of a person of ordinary skill in the art at the time of the invention. Id. at 986. In construing a claim, a court looks first to the intrinsic evidence of record, namely, the claims, the written description, and the prosecution history. Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1309 (Fed.Cir.1999). The claim language itself defines the scope of the claim, and "a construing court does not accord the specification, prosecution history, and other relevant evidence the same weight as the claims themselves, but consults these sources to give the necessary context to the claim language." Eastman Kodak v. Goodyear Tire & Rubber Co., 114 F.3d 1547, 1552 (Fed.Cir.1997). Extrinsic evidence may be consulted to ensure that the claim construction being considered by the court "is not inconsistent with clearly expressed, plainly apposite, and widely held understandings in the pertinent technical field." Pitney Bowes, 182 F.3d at 1309.

[4] Although the Federal Circuit has held that claims should be read in view of the specification, *see, e.g., id.,* the court has repeatedly cautioned against limiting the scope of a claim to the preferred embodiment or specific examples disclosed in the specification. *See, e.g.,* Ekchian v. Home Depot, Inc., 104 F.3d 1299, 1303 (Fed.Cir.1997); Intervet America, Inc. v. Kee-Vet Laboratories, Inc., 887 F.2d 1050, 1053 (Fed.Cir.1989) ("[L]imitations appearing in the specification will not be read into claims, and ... interpreting what is meant by a word in a claim 'is not to be confused with adding an extraneous limitation appearing in the specification, which is improper.' ") (citation omitted).

B. *Claim Construction for* the '785 Patent

1. *Claim 1*

a. *the preamble*

[5] Claim preambles may be interpreted as claim limitations when they are " 'necessary to give life, meaning, and vitality' to the claim." Pitney Bowes, 182 F.3d at 1306 (quoting Kropa v. Robie, 38 C.C.P.A. 858, 187 F.2d 150 (Cust.& Pat.App.1951)). Such treatment is proper when preamble statements are "intimately meshed with the ensuing language in the claim." *Id*. Preambles should not be construed as claim limitations, however, when the body of the claims fully sets forth the complete invention, and the preamble offers no distinct definition of any of the claims' limitations. Id. at 1305.

The preamble for claim 1 of the '785 patent recites "a method of fabricating on a substrate surface a fuse forming an integral part of a metallic interconnect line joining elements in an integrated circuit." EMI proposes that the court recognize that a "fuse forming an integral part of a metallic interconnect line" is "designed to be part of a structure that connects circuit elements until the fuse is blown, thereby altering the configuration of the integrated circuit in accordance with the circuit design." EMI argues that this preamble is a limitation, as it specifies a fuse. Since the last step of the claimed process requires that the fuse be blown, EMI reasons, the term "fuse" as introduced in the preamble is intimately meshed with the remainder of the claim language, and should be recognized as a limitation.

Cypress, on the other hand, contends that the preamble adds nothing to the meaning of the claims, and should be disregarded. Cypress suggests that if the entire preamble was truncated to simply read "a method which comprises," then the meaning of the claims would not change. As such, Cypress argues that the court should not recognize the preamble as a claim limitation.

[6] The court finds that the preamble of claim 1 does not inform the construction of the remainder of the claims, and is not itself a limitation. The case is distinct from Corning Glass Works v. Sumitomo Electric USA, 868 F.2d 1251, 1257 (Fed.Cir.1989), in which the preamble term "optical waveguide" informed the nature of fibers that were disclosed in the body of the claim. Here, the preamble term "fuse" does not teach what kind of structure is disclosed in the claim. Rather, the term "fuse" merely states a purpose or use for the claimed structure. *Id.* As such, the preamble does not give life to the claim language, and is not itself a limitation.

b. " *metal interconnect layer* "

[7] [8] The scope of an independent claim incorporates the embodiments recited in dependent claims. *See* Transmatic, Inc. v. Gulton Industries, Inc., 53 F.3d 1270, 1277 (Fed.Cir.1995). Claim 1 of the '785 patent claims the method of "forming a metal interconnect layer above the substrate surface." Claim 3 recites the method of claim 1 "wherein said metal interconnect layer comprises an aluminum alloy." The court agrees with EMI that the term "metal interconnect layer" includes interconnects made of metal alloys. The specification lends further support for this construction, as it states that the most common metal interconnects are made "of aluminum or aluminum alloys." The term "metal interconnect layer" thus refers either to pure elemental metals or to alloys.

c. " *above* "

[9] [10] A claim construction that excludes a preferred embodiment is "rarely, if ever, correct." Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1583 (Fed.Cir.1996). The first element of claim 1 recites that the metal interconnect layer is formed "above" the substrate surface. The specification states, as illustrated in Figure 1, that the interconnect layer (16) may be separated from the substrate layer (10) by a dielectric layer (12). Thus, the metal interconnect need not sit directly on top of the substrate layer. As is advocated by EMI, the court finds that the term "above" means higher than, but not necessarily directly in contact with.

d. " *an optically absorptive refractory transition metal* "

i. *composition of the metal*

One of the primary issues before the court is whether the term "an optically absorptive refractory transition metal," as claimed in the second element of claim 1, includes alloys. The court has determined that the term "metal," as used in the context of the metal interconnect layer, includes alloys. EMI urges that the court should construe the term "metal" similarly in this instance.

To interpret the meaning of this claim limitation, the court looks to the intrinsic evidence of the patent, which comprises the claims, the specification, and the prosecution history. *See* Pitney Bowes, 182 F.3d at 1309. Upon arriving at a claim construction based upon this intrinsic evidence, the court consults extrinsic evidence to verify that the claim construction under consideration is not inconsistent with widely held understandings in the pertinent technical field. *Id.*

[11] A term appearing repeatedly in the same claim should be interpreted consistently. *See* Digital Biometrics, Inc. v. Identix, Inc., 149 F.3d 1335, 1345 (Fed.Cir.1998). The word "metal," however, is not a discrete claim term. In claim 1, the word "metal" has two different usages. The "metal interconnect layer" is distinct from the "optically absorptive refractory transition metal." These "metals" have different elemental

compositions-the metal interconnect is made of an aluminum-based compound, while the metal absorptive layer comprises a transition metal. The "metals" also have different functions in the claimed method-the metal interconnect conducts electricity, while the metal absorptive layer absorbs laser light and transmits heat to the interconnect. Thus, the operative claim limitations are "a metal interconnect layer" and "an optically absorptive refractory transition metal," and the court is not bound by *Digital Biometrics* to interpret them consistently.

The specification does not provide grounds for finding that the term "an optically absorptive refractory transition metal" refers to alloys. The specification repeatedly distinguishes elemental metals from alloys. The specification recites that the interconnect may comprise "aluminum or aluminum alloys," and states that a diffusion barrier underneath the interconnect may comprise a "transition metal alloy." In the context of the absorptive layer, however, the specification only discusses the use of "a transition metal." Although the specification does not recite the use of a transition metal alloy in the absorptive layer, this alone is not fatal to EMI's proposed construction, as an applicant need not disclose every possible embodiment of his invention. *See* SRI International v. Matsushita Electric Corp., 775 F.2d 1107, 1121 (Fed.Cir.1985).

[12] The prosecution history, however, indicates that the scope of the claimed absorptive layer is limited to pure elemental metals. As originally submitted by the applicants, the claim recites a method for "forming a layer of optically absorptive material." When the PTO examiner rejected the claim in light of prior art references that employ blackened aluminum or silicon oxides for absorptive layers, the applicants amended their claims to recite "forming a layer of optically absorptive metal." In a second rejection, the examiner noted that the prior art already disclosed the use of molybdenum in a laser cutting process and stated that "even the use of a novel starting material would not necessarily render the process patentable." The applicants finally changed their claim by emphasizing the function of the absorptive layer in transferring laser energy to the interconnect, and as such amended their claim to read "using an optically absorptive refractory transition metal having a higher boiling point than the interconnect beneath it." Notably, the introduction of the word "an" to qualify the metal in the final amendment shows that the scope of the claims progressively narrowed from the use of any suitable material to the use of "an optically absorptive ... metal."

The applicants clearly contemplated that pure elemental metals are sufficient to enable the invention. In his first rejection letter, the examiner rejected the claims under s. 112 for failure to enable the invention, as he asserted that pure elemental transition metals were insufficiently absorptive to induce the claimed explosion. In reply the applicants stated that "titanium, tungsten, tantalum and molybdenum are optically absorptive metals, especially in relation to aluminum." The applicants discussed the physical properties of pure titanium that render it sufficiently absorptive to enable the claimed invention. They stated that "no further processing steps need be taken to prepare the materials optically absorptive." In this exchange with the examiner, the applicants relied on the physical properties of pure elemental metals to enable the device.

Having found no support in the intrinsic evidence to suggest that the claim limitation "an optically absorptive refractory transition metal" covers alloys, the court looks to extrinsic evidence to determine if a person of reasonable skill in the art would interpret the term "an optically absorptive refractory transition metal" to include alloys. Hawley's Condensed Chemical Dictionary defines the term "transition metal" equivalently as "transition element," and lists pure elements as fulfilling this definition. The dictionary clearly distinguishes between alloys and elemental metals, as the definition of "alloy" states that "[t]he properties of alloys are often greatly different from those of the components." Because the dictionary definition of the term "transition metal" does not indicate that this term refers to alloys, and because nothing in the intrinsic evidence suggests otherwise, the court concludes that the term "an optically absorptive

refractory transition metal" refers only to pure elemental metals, and does not include alloys. The court reserves the question as to whether the claim may cover alloys under the doctrine of equivalents.

ii. ***the relative absorptivity***

[13] The parties dispute the extent to which the transition metal layer must be optically absorptive with respect to the interconnect. Based on language in the specification, EMI asserts that the transition metal layer is "more absorptive of optical energy than the metal interconnect layer." Cypress advocates that no such limitation should be read into the claim, and that the claim should simply mean that the upper layer be "optically absorptive." Since the plain language of the claim suggests no limitation on the degree of absorptivity of the transition metal layer, the court declines to construe the specification's description of the high relative absorptivity of this layer as a claim limitation. *See* Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 1571 (Fed.Cir.1988). No judicial interpretation is necessary for this limitation.

e. " ***defining said metal interconnect layer and said optically absorptive layer into a patterned metallic interconnect for the integrated circuit including a fuse portion therein*** **"**

EMI asserts that the phrase "a fuse portion therein" refers to an element that is designed into the interconnect in order to customize a circuit or disconnect a defective element by blowing the fuse portion, thereby altering the configuration of the integrated circuit in accordance with the circuit design. This proposed definition derives from portions of the specification which describe the utility of fuses.

[14] The court rules that the plain language of the claim is unambiguous, and that it is unnecessary to introduce language from the specification to give meaning to the claim. Absent ambiguity requiring such interpretation, it would be improper to read a limitation from the specification into the claims. Constant, 848 F.2d at 1571.

f. " ***refractory metal forming a cap to prevent evaporation of said fuse portion when said fuse portion is exposed to a directed energy source to increase the vapor pressure under the cap to produce an explosive removal of said fuse portion*** **"**

i. ***the structure of the cap***

[15] The parties do not appear to dispute that the term "cap" is the layer of an optically absorptive refractory transition metal formed above the interconnect. The cap does not include a passivation layer, as the claim recites that it is the refractory metal that forms the cap.

ii. " ***to prevent evaporation ... to increase the vapor pressure under the cap to produce an explosive removal*** **"**

The court must decide whether the claim limitation "to prevent evaporation" means to prevent evaporation "from the top of the fuse portion," as is urged by EMI, or to "prevent all significant evaporation from the fuse portion," as is advocated by Cypress.

Neither the claim language, nor the specification, suggests that the claim language should be limited as sought by the parties. The patent does not specify that the cap should prevent evaporation "from the top of the fuse." Nor does the patent teach that the cap should prevent "all significant evaporation from the fuse portion." The claim language can be interpreted on its face. The court declines to construe the term "to

prevent evaporation ... to increase the vapor pressure under the cap to produce an explosive removal."

iii. *cause of the explosion*

[16] The parties agree that an increase in vapor pressure must cause the explosive removal of the fuse material. The parties appear to disagree, however, on the degree of causation required for the increased vapor pressure to induce the explosion. Cypress argues that the increased vapor pressure must be "the proximate cause" of the explosion. EMI states that the increased vapor pressure must be "a proximate cause" of the explosion, but that other forces may contribute to producing the explosion.

The patent examiner rejected claim 1 twice, and allowed the claim only when the inventors emphasized the function of the absorptive layer in inducing an explosion. The applicants explained that the absorptive cap "transfers the heat or energy ... to the underlying material and permits a vapor pressure to accumulate." In distinguishing their claimed invention from the prior art, the applicants stated that the art of record "generally calls for melting the fuse material, and nowhere is seen to suggest building up an explosive vapor pressure under a cap." Based on these statements, the examiner allowed the claims, remarking that "[t]he ability of the refractory metal to prevent evaporation of the underlying metal and cause explosive removal is an unexpected result which is not taught or suggested by the prior art."

The applicants succeeded in overcoming the examiner's rejections by emphasizing that the absorptive layer induces an explosion by preventing evaporation of the metal layer. Clearly, the increase in vapor pressure must proximately cause the explosive removal of the fuse portion. Neitherthe claims, specification, nor prosecution history, however, limit the explosion-inducing force to increased vapor pressure alone. Thus, the court holds that under the terms of the patent, increased vapor pressure must proximately cause the explosive removal of the fuse portion, but that other forces may contribute to the explosion. No judicial construction is required for the term "to prevent evaporation ... to increase the vapor pressure under the cap to produce an explosive removal."

g. " *removing said fuse portion from said interconnect line by exposing said optically absorptive refractory metal to directed energy source that explosively removes said fuse portion without damaging the substrate* "

[17] EMI contends that the phrase "without damaging the substrate" means causing no damage to the silicon substrate by the explosion. The section of the specification that supports this proposed construction, however, discloses other structures not to be damaged by the explosion, such as underlying polysilicon structures or a nearby metal fuse. It would be improper to limit the claim to "causing no damage to the silicon substrate," as other characteristics of the preferred embodiment would be foreclosed. *See* Vitronics, 90 F.3d at 1583. Rather, the court holds that the claim language needs no clarification, as it is clear on its face.

2. *Claim 9*

[18] The court is asked to decide whether claim 9, which is dependent on claim 1, covers the use of metal alloys for the absorptive layer, given its recitation of "a method as set forth in claim 1 wherein said optically absorptive metal is selected from the group consisting of titanium, tungsten, tantalum and molybdenum." The court has already determined that the term "an optically absorptive refractory transition metal" claimed in claim 1 does not cover the use of metal alloys. Since claim 9 is dependent on claim 1, it is necessarily narrower in scope than the independent claim, and cannot be construed to cover metal alloys. Thus, the

court holds that the term "optically absorptive metal" as used in claim 9, refers to elemental metals and not to metal alloys.

3. ***Claim 12***

a. " ***after said fuse portion forming step, forming a passivation layer over said patterned metallic interconnect*** **"**

[19] The parties agree, as does the court, that a passivation layer is an insulating layer, and that passivation may comprise a layer of oxide and/or a layer of nitrile. Based on language in the specification, EMI adds that when a fuse is blown according to the patent, "it is either fully or partially encased by passivation." Although this language is part of the specification, it would be improper to read this language into the limitations of the claim. Constant, 848 F.2d at 1571.

b. " ***testing the integrated circuit*** **"**

[20] EMI asserts that the claim limitation "testing the integrated circuit" covers determining if any circuit elements are defective and determining in what way to customize the circuit. At oral argument the parties agreed that testing does not concern identifying the device. The court thus accepts EMI's proposed construction of this term, with the understanding that testing does not mean identifying the device.

c. " ***said removing step comprising directing a laser light having a circular Gaussian distribution of energy on said optically absorptive layer of said fuse to vaporize said fuse portion*** **"**

[21] EMI argues that the claim language "to vaporize said fuse portion" should require that some of the fuse materialvaporizes as a part of the step of removing the fuse portion, wherein "vaporizes" means to begin to convert into vapor. Cypress, on the other hand, argues that the claim language should be construed to require that the whole fuse portion be vaporized.

The court, however, finds no justification to read these proposed limitations into the claim. As used in this claim, "to vaporize" means "to convert into vapor," such that "to vaporize said fuse portion" means "to convert said fuse portion into vapor." No other judicial construction is necessary for this claim language.

4. ***Claim 17. "A method as set forth in claim 1 further including the step of: after said fuse portion forming step, removing said fuse portion from said interconnect by directing a laser light on said exposed optically absorptive layer to melt said fuse portion."***

[22] Cypress asks the court to construe the meaning of the term "exposed." Claim 17 derives from, and is identical to, the language of claim 20 of the original patent application. As written, claim 20 of the application depends from claim 1 of the application. Claim 20's term "said exposed optically absorptive layer," however, lacks an antecedent basis, as claim 1 of the application makes no reference to such an exposed layer. The examiner apparently overlooked this defect.

The meaning of the term "said exposed optically absorptive layer" is ambiguous. The word "exposed" is used twice in the application's claims. In one context, "exposed" means "exposed to laser light." This use of the word "exposed" is found in claims 12, 17, and 18. In a second context, "exposed" is used to refer to the state of the absorptive layer once the overlying passivation layer has been etched away. This use of the word "exposed" is found in claims 15 and 19.

The language of claim 20 indicates that "exposed," as used therein, means exposed from the etching of the passivation layer, as recited in claim 19 of the application. Claim 20 reads "directing a laser light on said exposed ... layer." Since there is only one laser light at use in the claimed process, the "exposed layer" must first become exposed through etching if it is then to have a laser light directed upon it.

EMI argues that claim 17 of the patent derives its antecedent basis from claim 1 of the patent, and as such means "exposed to the directed energy source." Claim 1 of the patent, however, did not acquire the word "exposed" until after the claim was twice amended. The court declines to find that amending claim 1 to overcome rejections on other grounds somehow redefined the antecedent basis of application claim 20, which was not a focus of the prosecution history. Moreover, to posit that the term "exposed" of claim 17 derives its antecedent basis from claim 1 leaves a nonsensical claim, as claim 17 recites directing a laser light upon an "exposed" absorptive layer. Since the claims recite the use of only one laser, the absorptive layer cannot be "exposed" prior to having a laser light directed upon it, unless it is exposed through etching.

The court rules that "exposed," as used in claim 17 of the patent, means "exposed by removal of the overlying passivation layer."

5. ***Claim 18.*** **"*The method of claim 1 wherein said optically absorptive layer is formed directly upon the top surface of and in contact with said metallic interconnect layer.*"**

The parties agree, as does the court, that the fuse, as recited in Claim 18, must have a top layer which is resting on the underlying layer of the metallic interconnect layer.

C. ***Claim Construction for*** the '801 Patent

1. ***Claim 1***

a. ***the preamble***

EMI argues that the term "fuse" in the preamble is a claim limitation, and that its proper construction is "a structure designed and intended to be removable in order to create a disconnection of previously joined elements of an integrated circuit." For the reasons set forth above regarding the preamble of the '785 patent, the court rules that the term "fuse" is not a claim limitation.

b. " ***a layered interconnect structure having an upper layer of an optically absorptive material and a lower layer of metal below said upper layer*** **"**

[23] EMI argues for the following construction of this claim: (1) the optically absorptive material is more absorptive of optical energy than the metal interconnect layer (and thus less electrically conductive); (2) the optically absorptive material has a higher boiling point than the metal interconnect layer; (3) a metal is an element or an alloy; and (4) "below" means lower than, but not necessarily in contact with. The court rules that the term "a lower layer of metal" refers to elemental metals or alloys, and that the other limitations of this claim element do not require judicial construction.

c. " ***said upper layer forming an explosion-inducing cap*** **"**

[24] EMI asserts that an "explosion-inducing cap" is an upper layer of the fuse that induces an explosion to occur, wherein an explosion is a violent burst or rupture produced by an increase in internal pressure or as a result of pressure from within. Cypress argues: (1) that the cap must induce the explosion; (2) that the explosion must be caused by the lower metal vaporizing before the upper cap; and (3) that the cap must induce the explosion by containing vapor pressure built up as a result of the lower layer vaporization.

The court rules that the term "explosion-inducing cap" means "a cap that induces an explosion." The term "explosion" needs no construction by this court. The language of this element of the claim does not require the lower metal to vaporize before the upper cap, nor does it require the cap to somehow "contain" the vapor pressure buildup.

d. " ***said layered interconnect configured such that a laser light directed on said upper layer is absorbed thereby and causes said lower layer to vaporize before said upper layer vaporizes thereby inducing an explosion which substantially removes said layered interconnect structure, disconnecting the previously joined elements of the integrated circuit*** **"**

i. " ***causes said lower layer to vaporize before said upper layer vaporizes*** **"**

Cypress asserts that the term "causes said lower layer to vaporize before said upper layer vaporizes" should be construed to require that the lower layer of the fuse "is converted to vapor" before the upper layer or cap is converted to vapor. Rephrased, Cypress contends that the claim requires the lower layer "to vaporize, not just begin to vaporize."

As discussed above, the original claim language (claim 22 in the application) recites that the energy of the laser light, when transferred to the metal interconnect "causes said metal layer to melt." When that claim was rejected, the applicants amended it to read "causes said lower layer to boil before said upper layer melts." The examiner rejected the amended claim for indefiniteness and for lack of support in the specification. After a telephone interview, the examiner allowed the claim to read "causes said metal layer to vaporize before said upper layer vaporizes."

Cypress argues that this prosecution history precludes EMI from asserting that "vaporizes" means "begin to vaporize." According to Cypress, since "boil" refers to the heating of a substance to the vaporizing point "with consequent bubbling up of gases," the disallowed term "boil" covers the phenomena "to begin to vaporize." Thus, Cypress contends, "vaporize," as was finally allowed by the examiner, must be distinct from "boil," and cannot mean "to begin to vaporize."

The examiner disallowed the term "boil" for indefiniteness and for lack of support in the specification. Indeed, the patent specification nowhere states that the lower metal layer boils. The patent, however, does disclose the vaporization process, and states that the explosion takes place after the surface temperature rises and "the fuse begins to evaporate." When the examiner disallowed the term "boil," he did not preclude the term "vaporize" from meaning "begin to vaporize." To so find would be to interpret the claims in such a way as to exclude the preferred embodiment from the claims.

[25] The court, nonetheless, does not construe "vaporize" to mean "to begin to vaporize," as is urged by EMI. Rather, the court rules that "vaporize" simply means "to convert into vapor." As such, the term "causes said lower layer to vaporize before said upper layer vaporizes" means "causes said lower layer to convert into vapor before said upper layer converts into vapor."

ii. " *thereby inducing an explosion* "

[26] The parties disagree on the degree of causation between the vaporization and the explosion. Cypress asserts that the explosion must be "proximately caused" by the vaporization, and that it is "not enough that some amount of vaporization, however modest, makes some contribution, however modest, to a pressure buildup that results in the explosion." EMI agrees that the vaporization must cause the explosion, but contends that other forces may contribute to the rupture.

The claim language is unambiguous, and it would be inappropriate to impose other limitations upon the claim that may be inferred from the specification. The court rules that "thereby inducing an explosion" means "whereby the vaporization induces an explosion."

iii. " *substantially removes said layered interconnect structure, disconnecting the previously joined elements of the integrated circuit* "

[27] The parties disagree on the extent to which the explosion must remove the interconnect structure and produce a disconnect. Cypress argues that the explosion must sever the fuse and disconnect the circuitry. EMI, on the other hand, contends that the claim covers a disconnection created entirely by the explosion or by a disconnection created by an explosion that removes some material, with the remaining material vaporized during the same laser pulse.

The claim language is ambiguous as to whether the term "disconnecting the previously joined elements" modifies the term "explosion," or whether it describes the result of the direction of the laser light upon the absorptive layer. The ambiguity obscures the question of whether the patent covers an apparatus that employs a single laser pulse wherein the explosion occurs relatively early in the pulse, and wherein the disconnection is created later in the duration of the pulse as a result of the vaporization of metal after the fuse has already been ruptured.

[28] Claims are to be read in view of the specification. Markman, 52 F.3d at 979. Although it is improper to import a limitation from the specification, the court may look to the specification to help interpret terms already present in the claims. Ethicon Endo-Surgery, Inc. v. United States Surgical Corp., 93 F.3d 1572, 1578 (Fed.Cir.1996). The court is presented with two alternative antecedents for the claim term "disconnecting the previously joined elements." By selecting which of two claim terms the "disconnecting" limitation modifies, the court is not imposing new limitations upon the claims, but is simply interpreting the claims in light of the specification.

The specification states that the vaporization of the metal results in a buildup of pressure under the cap. According to the specification, "[t]his results in an explosive reaction that removes the melted fuse material (as shown in Figs. 5a and 5b which correspond to the embodiments of 4a and 4b) thereby producing an open electrical path having a substantially infinite resistance." The figures referenced illustrate that the explosive reaction severs the interconnect completely. As presented in the specification, the explosion must sever the fuse and disconnect the circuitry.

The claim language requires only that the explosion "substantially removes" the interconnect. While some pieces of the interconnect may remain after the explosion, the "disconnecting" limitation requires that the explosion result in an open electrical path. Thus, the court finds that the term "disconnecting the previously joined elements" means "whereby the explosion disconnects the previously joined elements."

2. ***Claim 3.*** **"*A fuse according to claim 1 wherein said optically absorptive material comprises a transition metal.*"**

[29] The term "wherein said optically absorptive material comprises a transition metal" means that the absorptive material can encompass more than a single elemental transition metal, and that the absorptive material may refer to alloys.

3. ***Claim 4.*** **"*A fuse according to claim 2[sic] wherein said optically absorptive material comprises titanium and is from 200 to 1,0000 [sic] Angstroms in thickness.*"**

[30] EMI points to the prosecution history to show that claim 4, as appears in the patent, contains two typographical errors. EMI states that the term "claim 2" should read "claim 1," and that "1,0000" should read "1,000." Both these printing error are apparent from the file history of the '801 patent. The court agrees that the claims should be corrected as advocated by EMI. *See* Lemelson v. General Mills Inc., 968 F.2d 1202, 1203 n. 3 (Fed.Cir.1992) (using claim language from prosecution history instead of erroneous language appearing in claims).

4. ***Claim 5***

a. ***the preamble***

EMI argues that the term "fuse" as used in the preamble is a claim limitation. For the reasons set forth in the discussion of claim 1 of the '785 patent and claim 1 of the '801 patent, the court rules that the term "fuse" is not a claim limitation.

b. " ***a layered interconnect structure having an explosion-inducing cap which includes an upper layer of an optically absorptive material*** **"**

i. " ***explosion-inducing cap*** **"**

The same term used in different claims should be given the same meaning. Digital Biometrics, Inc. v. Identix, Inc., 149 F.3d 1335, 1345 (Fed.Cir.1998). As such, the term "explosion-inducing cap," as used here, means "a cap that induces an explosion," as it was construed in claim 1 of the '801 patent.

ii. " ***which includes an upper layer of an optically absorptive material*** **"**

This claim element does not require judicial interpretation.

iii. " ***absorptive*** **"**

EMI asserts that "the term "absorptive," as used here," should mean that the "optically absorptive material" would absorb more radiant optical energy relative to another material. No such limitation, however, is called for by the claims.

c. " ***said layered interconnect structure further including a lower layer of metal below said upper layer*** **"**

This claim requires that the interconnect structure must include a layer of metal below the upper layer. The claim does not require that the lower layer be more electrically conductive than the upper layer.

d. " ***said optically absorptive material having a higher boiling temperature relative to said metal*** **"**

The term "optically absorptive material" does not require judicial construction.

e. " ***said layered interconnect structure being responsive to a laser light having a Gaussian energy distribution output on said upper layer, such that when said layered interconnect structure is exposed to said laser light, said upper layer absorbs said laser light and transmits heat to said lower layer, said lower layer vaporizes before said upper layer causing an explosion, said explosion forming an opening between said elements of said integrated circuit*** **"**

i. " ***said lower layer vaporizes before said upper layer*** **"**

The court construes the term "said lower layer vaporizes before said upper layer" in the same manner as the term "said lower layer to vaporize before said upper layer," as recited in claim 1. The court declines to find that "vaporizes" means either "is converted to vapor" or "begins to vaporize." Rather, "vaporizes" means "converts into vapor." Thus, the term "said lower layer vaporizes before said upper layer" means "said lower layer converts into vapor before said upper layer."

ii. " ***causing an explosion*** **"**

The claim "causing an explosion" does not require judicial construction.

iii. " ***said explosion forming an opening between said elements of said circuit*** **"**

The parties disagree on the extent to which the explosion must open the circuit. According to EMI, the disconnection can occur entirely as a result of an explosion, or as the result of an explosion that removes some material while the remaining material is subsequently vaporized by the same laser pulse. Cypress, on the other hand, argues that the explosion itself must sever the fuse and disconnect the circuitry.

The claim plainly states that the explosion forms the disconnect. The claim requires that the opening in the circuit be formed by the explosion, not by the effect of laser light absorbed after the explosion. The court construes the term "said explosion forming an opening" to mean "whereby said explosion forms an opening."

III. *CONCLUSION*

For the reasons stated above, the disputed claims of the '785 and '801 patents are construed as follows.

A. *The* '785 Patent

1. *Claim 1*

The term "fuse" in the preamble is not a claim limitation. The term "metal interconnect layer" refers to pure elemental metals or to alloys. The term "above" in the limitation "a metal interconnect layer above the substrate surface" means "higher than, but not necessarily directly in contact with." The term "an optically absorptive refractory transition metal" refers to pure elemental metals, and not to alloys. No judicial construction is necessary for the term "optically absorptive," when referring to the relative absorptivity of the absorptive layer and the interconnect. No judicial construction is necessary for the term "a fuse portion therein." The term "cap" in the limitation "said refractory metal forming a cap" refers to the layer of the

optically absorptive refractory transition metal, and does not refer to the passivation layer. The term "to prevent evaporation ... to increase the vapor pressure under the cap to produce an explosive removal" needs no judicial construction. The term "without damaging the substrate" needs no judicial construction.

2. ***Claim 9***

The term "optically absorptive metal" refers to elemental metals and not to metal alloys.

3. ***Claim 12***

The term "passivation layer" means "an insulating layer that may comprise a layer of oxide and/or a layer of nitrile." The term "testing the integrated circuit" refers to "determining if any circuit elements are defective and determining in what way to customize the circuit." The term "to vaporize said fuse portion" means "to convert said fuse portion into vapor."

4. ***Claim 17***

The term "exposed" means "exposed by removal of the overlying passivation layer."

5. ***Claim 18***

The fuse, as described in claim 18, must have a top layer which is resting on the underlying layer of the metallic interconnect layer.

B. ***The*** '801 Patent

1. ***Claim 1***

The term "fuse" in the preamble is not a claim limitation. The term "a lower layer of metal" refers to elemental metals or alloys. The term "explosion-inducing cap" means "a cap that induces an explosion." The term "explosion" does not require judicial construction. The term "causes said lower layer to vaporize before said upper layer vaporizes" means "causes said lower layer to convert into vapor before said upper layer converts into vapor." The term "thereby inducing an explosion" means "whereby the vaporization induces an explosion." The term "disconnecting the previously joined elements" means "whereby the explosion disconnects the previously joined elements."

2. ***Claim 3***

The term "wherein said optically absorptive material comprises a transition metal" means that the absorptive material can encompass more than a single elemental transition metal, and that the absorptive material may refer to alloys.

3. ***Claim 4***

The term "claim 2" should be amended to read "claim 1" and the term "1,0000" should be amended to read "1,000."

4. ***Claim 5***

The term "fuse" in the preamble is not a claim limitation. The term "an explosion-inducing cap" means "a cap that induces an explosion." The term "said layered interconnect structure further including a lower layer of metal below said upper layer" requires that the interconnect structure must include a layer of metal below the upper layer. The term "optically absorptive material" does not require judicial construction. The term "said lower layer vaporizes before said upper layer" means "said lower layer converts into vapor before said upper layer." The term "causing an explosion" does not require judicial construction. The term "said explosion forming an opening" means "whereby said explosion forms an opening."

D.Del.,1999.
EMI Group North America, Inc. v. Cypress Semiconductor Corp.