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Paper No. 45
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NUEVOLUTION A/S,
Petitioner,

v.

CHEMGENE HOLDINGS APS,
Patent Owner.

Case IPR2017-01603
Patent 8,951,728 B2

Before SUSAN L. C. MITCHELL, ROBERT A. POLLOCK, and TIMOTHY G. MAJORS, *Administrative Patent Judges*.

MAJORS, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
Claim 1 Shown to Be Unpatentable
35 U.S.C. §§ 314, 318(a) and 37 C.F.R. §§ 42.4(a), 42.73

ORDERS
Denying-In-Part Petitioner's Motion to Exclude (Paper 35)
37 C.F.R. § 42.64(c)

I. INTRODUCTION

A. Overview

Nuevolution A/S ("Petitioner") filed a Corrected Petition to institute *inter partes* review of claim 1 of U.S. Patent No. 8,951,728 B2 (Ex. 1002, "the '728 patent"). Paper 8 ("Petition" or "Pet."). Chemgene Holdings APS ("Patent Owner") filed a Preliminary Response to the Petition. Paper 9 ("Prelim. Resp."). On January 10, 2018, we instituted trial to review the patentability of claim 1 on four of the fourteen grounds advanced in the Petition. Paper 15 ("Inst. Dec.").

In light of *SAS Institute, Inc. v. Iancu*, 138 S. Ct. 1348 (2018), we later instituted trial on the remaining ten grounds presented in the Petition ("the additional grounds") and ordered the parties to confer to discuss whether changes to the schedule and/or additional briefing (beyond what was already filed or authorized) were necessary to address the additional grounds. Paper 24. On May 10, 2018, the parties responded via email, informing the Board that no changes to the schedule were necessary, that Patent Owner requested its Preliminary Response (Paper 9) be considered as part of the trial proceedings because Patent Owner intended to rely on its arguments in that paper related to the additional grounds, and that Petitioner requested an enlargement of the word limit for its Reply to address the additional grounds. Paper 25, 2–3. We granted each of those unopposed requests. *Id.* We also granted the parties' request that the Board consider and make part of the trial proceedings the supplemental pre-institution claim construction briefing that was authorized. Paper 13 (Petitioner's Reply to Patent Owner's

Preliminary Response) and Paper 14 (Patent Owner's Sur-Reply); Paper 25, 2–3.

During the trial, Patent Owner filed a Response. Paper 21 ("Resp."). Petitioner filed a Reply to Patent Owner's Response. Paper 28 ("Reply"). Patent Owner asked for authorization to file a motion to strike the Reply for alleged non-compliance with 37 C.F.R. § 42.23(b). We did not grant authorization, but permitted the parties to submit supplemental briefing on the issue. Papers 29–31. And, per Patent Owner's request, we authorized argument on the issue at the oral hearing, and we indicated the Board would consider such briefing and oral argument in assessing whether the Reply exceeded the scope permitted under Rule 42.23(b). *Id.* Patent Owner filed a Contingent Motion to Amend (Paper 20), to which Petitioner filed an Opposition (Paper 26).[1] Petitioner also filed a Motion to Exclude Evidence. Paper 35. Patent Owner opposed that motion, and Petitioner replied. Paper 38; Paper 39.

Both parties requested oral argument (Paper 37; Paper 38), which we scheduled for September 18, 2018 (Paper 40). On September 12, Patent Owner submitted an unopposed request to withdraw its Motion to Amend and to withdraw its request for oral argument (Paper 41 (Sept. 12, 2018 Notice of Stipulation and Proposed Order)), which we granted (Paper 42). On September 14, 2018, Patent Owner responded via email to the Board's Order (confirming that the September 18 Oral Argument would proceed (Paper 43)), and stated Patent Owner was ceding its allotted time and had

[1] Several days before the scheduled Oral Argument, Patent Owner made an unopposed request to withdraw its Motion to Amend. Paper 41 (Sept. 12, 2018 Notice of Stipulation and Proposed Order). We granted Patent Owner's request. Paper 42.

elected not to appear at the Oral Argument. Ex. 3001; Paper 44 ("Tr."), 3:13–18. On September 18, 2018, we held Oral Argument (which Patent Owner did not attend) and the transcript has been entered into the record. *See* Tr.

The '728 patent includes one claim that recites a method of synthesizing encoded molecules, which are described in detail below. Petitioner's challenges addressed in this Final Written Decision turn largely on whether the asserted prior art discloses the synthesis of encoded molecules — via the addition of a molecule fragment, a linker, and an oligonucleotide identifier — in the *same* reaction well. Patent Owner agrees this is what claim 1 requires, but that the prior art discloses only that such molecules are synthesized in multiple *different* reaction wells. *See*, *e.g.*, Prelim. Resp. 2–3, 6–8, 13, 15–17; Paper 14, 1, 7. Petitioner, on the other hand, argues that a "well" is not limited to any specific physical container or vessel such that claim 1 embraces synthesis of particular encoded molecules in one container, or in many, provided the desired reactions occur and the desired molecules are made. Paper 13, 3–4; Reply 1, 3–4. Petitioner alternatively argues that even if claim 1 requires synthesis of particular encoded molecules in the *same* reaction well and this means a single container (e.g., a well on a microtiter plate), this is disclosed in the asserted prior art. *See*, *e.g.*, Pet. 11–13, 69–78, 85–86; Reply 1, 9, 11–13. We further address the arguments and evidence on these points below.

We have jurisdiction under 35 U.S.C. § 6, and we issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. As explained below, we conclude that Petitioner has established by a preponderance of the evidence in this trial record that claim 1 of the '728 patent is unpatentable.

B. Related Proceedings

Petitioner identifies no prior or pending litigation related to infringement or invalidity of the claim of the ’728 patent. Pet. 2. Petitioner, however, identifies proceedings in the United States District Court for the Eastern District of Virginia (*Nuevolution A/S v. Pedersen*, No. 1:14-CV-00357 (E.D. Va.)) and the Maritime and Commercial High Court in Denmark (*Nuevolution A/S v. Pedersen*, T-16-12) related to correction of inventorship of the ’728 patent and/or Petitioner’s entitlement to rights in the ’728 patent (or its PCT priority application). *Id*. at 2–3. According to Petitioner, the U.S. district court dismissed the proceedings in Virginia on the basis of *forum non conveniens*. *Id*. at 3.

Patent Owner provides more information about those proceedings. Patent Owner notes that the United States Court of Appeals for the Federal Circuit (*Nuevolution A/S v. Chemgene Holdings APS*, 693 F. App’x 907 (Fed. Cir. July 19, 2017)) affirmed the district court’s dismissal. Prelim. Resp. 9; Ex. 2001 (affirming under Fed. Cir. R. 36). Regarding the proceedings in Denmark, Patent Owner asserts that, in February 2016, the “Maritime and Commercial Court ruled that a 2007 Settlement Agreement between Nuevolution and Chemgene completely and perpetually bars Nuevolution from challenging Chemgene’s ownership of the PCT application and all related rights, including the ’728 patent.” Prelim. Resp. 9. Nuevolution, however, appealed this ruling to the Danish Court of Appeal, which remanded the case to the Maritime and Commercial Court on December 8, 2017. *Id.*; Resp. 38.

Petitioner also filed petitions for *inter partes* review of claims in U.S. Patent No. 8,168,381 B2 (IPR2017-01598 and IPR2017-01599). Pet. 3.

U.S. Patent No. 8,168,381 B2 ("the '381 patent") issued from the grandparent application to the '728 patent. *Id*.; Exs. 1001, 1002.

C. The '728 Patent

The '728 patent relates generally to a method for synthesizing encoded molecules. Ex. 1002, 1:34–35. The Specification explains that "[m]ethods are desired for increasing the efficiency of production and screening of chemical libraries with the purpose of generation and isolation of new compounds that can be used for applications in medicine, agriculture and other areas." *Id*. at 1:40–43.

According to the '728 patent, known methods for production and screening of chemical libraries include the use of DNA-encoding of compounds. *Id*. at 1:64–2:17. In one approach using "DNA-encoded libraries, each compound in the library is attached to a unique identifier that 'encodes' the chemical structure of the molecule to which it is attached." *Id*. at 2:1–4. DNA-encoding in this way, the Specification explains, provides for efficient screening and selection of compounds with desired characteristics (e.g., binding to a target) because "the isolated compound-DNA complexes can be identified at the end by PCR-amplification, cloning, and sequencing of the DNA portion." *Id*. at 1:65–2:1; *see also id*. at 1:40–63. In other words, "the structure of a molecule that is selected in [a] screening assay can easily be decoded by [an] attached unique identifier." *Id*. at 2:4–6.

As further background, the Specification discloses that DNA-encoded libraries have also been made with a template-based approach. *Id*. at 2:6–7. "In this approach, DNA templates direct the synthesis of the encoded

compounds." *Id*. at 2:8–9. Recovered DNA-compound complexes can be amplified and used in subsequent rounds of synthesis. *Id*. at 13–17.

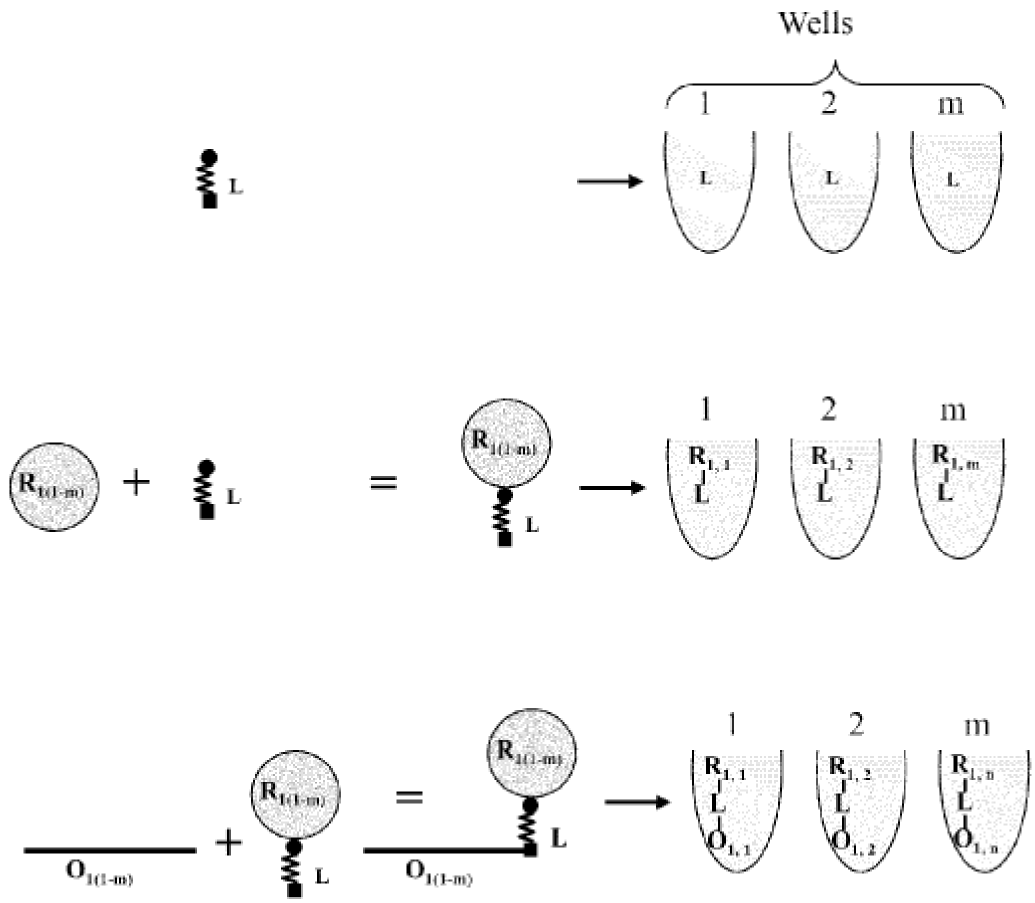
According to the Specification, "[t]he present invention combines the non-templated technique . . . with the template technique . . . and thereby provides an improved method for the generation of oligonucleotide-encoded libraries." *Id*. at 2:21–24; *see also id*. at Abstract ("The invention combines the advantages of split and mix synthesis with the advantages of template directed synthesis.").

The Specification defines several terms helpful to understanding the invention. *Id*. at 3:15–7:55. These definitions include, *inter alia*:

> Bi-functional molecule means a bi-functional molecule consisting of an encoded molecule (e.g. a low molecular weight organic molecule) and an oligonucleotide (e.g. a single- or double-stranded DNA molecule), where the oligonucleotide sequence uniquely identifies the identity (structure) of the encoded molecule. The encoded molecule and the identifier are physically connected through a linker moiety.

Id. at 3:17–24. The term "[c]arrier molecule" (used interchangeably with carrier and bi-functional carrier molecule) "is a bi-functional molecule that is employed in a Stage 2 templated synthesis, and may be generated by e.g. stage 1 [split and mix] synthesis." *Id*. at 3:32–35. The Specification also defines an "[e]ncoded molecule" as "[t]he portion of the bi-functional molecule that is encoded by the oligonucleotide identifier of the bi-functional molecule." *Id*. at 3:45–47. And the term "[i]dentifier" is defined as "[a]n oligonucleotide that encodes (specifies) the identity of the molecule fragment or encoded molecule to which it is attached." *Id*. at 3:54–56.

The Specification's drawings are also helpful in understanding the invention. Figure 1, reproduced in part below, depicts an initial formation of bi-functional molecules as part of a "Stage 1" synthesis. *Id*. at 9:51–57.

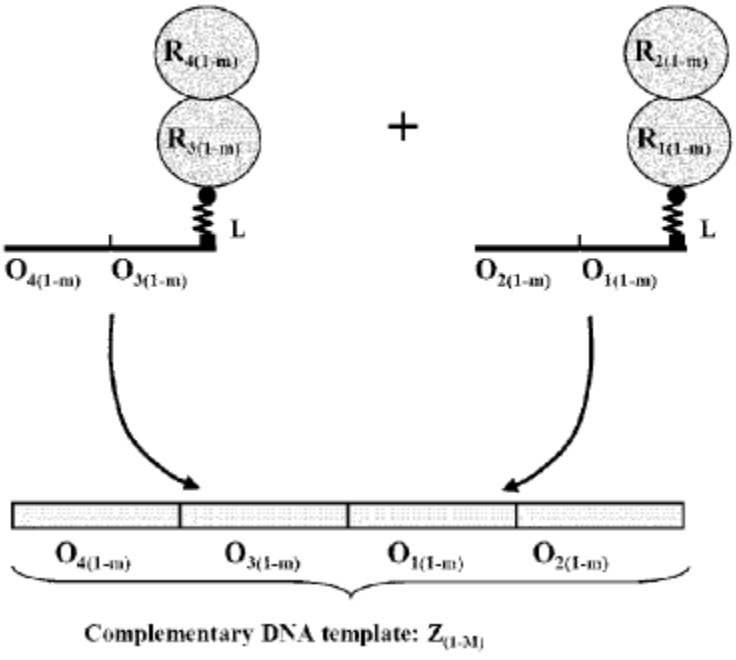


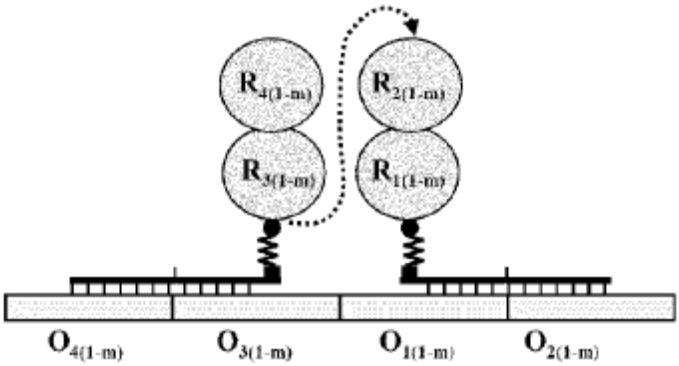
Id. at Fig. 1 (partial). Figure 1 shows a linker molecule "L" is first added to wells (1 through m) in a microtiter plate. *Id*. at 9:63–64. This step is followed by addition of different amino acids (R_1, 1 through m) — "one type of amino acid per well (i.e., a specific amino acid to each well) . . . operatively linked to the linker molecule." *Id*. at 9:66–10:1. An oligonucleotide identifier (O_1, 1 through m) is then added to each well and operably linked to the linker molecule, such that "[e]ach well now contains a bi-functional molecule that consists of a linker molecule linked to an amino

acid and an identifier oligonucleotide." *Id*. at 10:3–7. In this way, "[t]he sequence of the oligo encodes the type of amino acid added to that well." *Id*. at 10:9–10.

After this initial process, the wells' contents may be pooled and split into wells on a new plate, and a new round of synthesis applied. *Id*. at 10:14–19. For instance, by adding additional amino acids and oligonucleotide identifiers to the new wells, each well will contain a bi-functional molecule consisting of a di-peptide (two amino acids bound to each other) linked to a nucleotide sequence (two oligonucleotide identifiers bound to each other) encoding the di-peptide. *Id*. at 10:17–33, Fig. 1.

The Specification also describes and illustrates a "Stage 2" templated synthesis. *See, e.g.*, *id*. at 11:4–32, Fig. 2. This stage "essentially links together the bi-functional carrier molecules provided by stage 1 in different combinations." *Id*. at 11:7–9. For example, as shown in Figure 2, the method uses a DNA template that is complementary to a pair of bi–functional molecules.





Id. at Fig. 2 (partial). Figure 2 shows that by hybridizing the bi-functional molecules' DNA/oligo portions to a complementary template, the encoded molecules (e.g., di-peptide of each carrier) are brought close and allowed to react — transferring the encoded molecule of one bi-functional molecule to the other. *Id*. at 11:36–46. The reaction shown forms a tetrapeptide that is "linked . . . to a template that encodes the combination of the di-peptides and thus, ultimately encodes the tetrapeptide." *Id*. at 11:47–60.

D. Illustrative Claim

Petitioner challenges claim 1, the only claim of the '728 patent. Claim 1 reads as follows:

> 1. A method for synthesizing an encoded molecule comprising the steps of:
>
> a) Adding a linker molecule L to one or more reaction wells;
>
> b) Adding a molecule fragment to each of said reaction wells;
>
> c) Adding an oligonucleotide identifier to each of said reaction wells;
>
> d) Subjecting said wells to:
>
> conditions sufficient to allow said molecule fragments and said oligonucleotide identifiers to become attached to said linker molecule, or
>
> conditions sufficient for said molecule fragments to bind to other molecule fragments and sufficient for said oligonucleotide identifiers to bind to other oligonucleotide identifiers;

> e) Combining the contents of said one or more reaction wells;
>
> wherein at least one reactive group of the linker molecule L reacts with a reactive group in the molecule fragment, or with a reactive group in the oligonucleotide;
>
> wherein at least one reactive group of the molecule fragments reacts with a reactive group in the linker molecule L, or with a reactive group in another molecule fragment,
>
> wherein at least one reactive group of the oligonucleotide identifiers reacts with a reactive group in the linker L, or with a reactive group in another oligonucleotide identifier; and
>
> wherein the region of the oligonucleotide identifier added to each well in step c), which hybridizes to said template identifies the molecule fragment added to the same well in step b).

Ex. 1002, 137:1–138:17.

E. The Asserted Grounds of Unpatentability

Petitioner contends claim 1 is unpatentable under 35 U.S.C. §§ 102 and/or 103 based on the following grounds. Pet. 6–7.

Ground	Reference(s)	Basis
1	Gouliaev '627[2]	§ 102
2	Pedersen[3]	§ 102
3	Pedersen	§ 103
4	Freskgård[4]	§ 102
5	Freskgård	§ 103
6	Freskgård and Pedersen	§ 103

[2] Gouliaev et al., WO 03/078627 A2, publ. Sept. 25, 2003 (Ex. 1007).
[3] Pedersen et al., WO 02/103008 A2, publ. Dec. 27, 2002 (Ex. 1004).
[4] Freskgård et al., WO 2004/039825 A2, publ. May 13, 2004 (Ex. 1003).

Ground	Reference(s)	Basis
7	Gouliaev '994[5]	§ 102
8	Gouliaev '994	§ 103
9	Franch '929[6]	§ 102
10	Franch '929	§ 103
11	Freskgård and Franch '929	§ 103
12	Franch '427[7]	§ 102
13	Franch '427	§ 103
14	Freskgård and Franch '427	§ 103

Petitioner also relies on, among other evidence, the Declarations of Nicolas Winssinger, Ph.D. Exs. 1015, 1030.

In the initial decision on institution, the Board instituted trial only on those grounds challenging claim 1 as obvious over Freskgård (alone or combined with other references) — Grounds 5, 6, 11, and 14 from the table above. Paper 15, 54–55. Nevertheless, after the Supreme Court's decision in *SAS*, we modified the institution decision to include the remaining grounds (grounds 1–4, 7–10, 12, and 13) in the trial proceedings. Paper 24.

II. ANALYSIS

A. Person of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art would have been one "with a Ph.D. in organic chemistry, molecular biology or a closely

[5] Gouliaev et al., WO 2004/056994 A2, publ. July 8, 2004 (Ex. 1006).
[6] Franch et al., WO 2004/024929 A2, publ. Mar. 25, 2004 (Ex. 1005).
[7] Franch et al., WO 2004/083427 A2, publ. Sept. 30, 2004 (Ex. 1016).

related field [, and] with a minimum of 3-5 years of additional experience in medicinal chemistry with an emphasis on drug discovery." Pet. 21; Ex. 1015 ¶¶ 30–32. For its part, Patent Owner asserts that the ordinarily skilled person "would have held a doctoral degree in chemistry, molecular biology, or a closely related discipline, and had at least three years of practical academic or industrial laboratory experience." Prelim. Resp. 10.

Although not identical, Petitioner and Patent Owner propose similar qualifications of the skilled artisan. We do not discern a material difference between the parties' proposals and find that the parties' proposals are consistent with the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (explaining that specific findings regarding ordinary skill level are not required "where the prior art itself reflects an appropriate level and a need for testimony is not shown") (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)). We apply Patent Owner's proposal, but our conclusions in this Final Written Decision would be the same under either proposal.

B. Claim Construction

In this *inter partes* review, we interpret claim terms in an unexpired patent based on the broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142 (2016) (affirming the broadest reasonable construction standard in *inter partes* review proceedings). "Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history." *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016). Special definitions must be

set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). We need only construe terms in controversy, and only to the extent necessary to resolve that controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Upon review of the parties' arguments, including the supplemental pre-institution claim construction briefing that we authorized (Paper 13; Paper 14), we interpreted two claim terms/phrases identified by the parties in our Decision on Institution. Inst. Dec. 24–32. Those terms/phrases are: (i) "template" and (ii) "one or more reaction wells . . . each of said reaction wells." *Id.* The parties do not propose, nor do we discern, that other terms require further express construction to resolve the patentability of claim 1 in this Final Written Decision.

Petitioner proposed an unrebutted interpretation of "template" that we adopted in our Decision on Institution. *Id.* at 31. As we explain further below, the parties disputed the interpretation of the phrase "one or more reaction wells . . . each of said reaction wells." *Id.* We interpreted the term "well" as "a physical containment of reagents, molecule fragments, etc. in a localized space," consistent with the '728 patent's definition of "well." *Id.* at 28. Based on, *inter alia*, the "each of said reaction wells" language in the claim, we also agreed with Patent Owner and interpreted the entire phrase as requiring that synthesis of any particular bi-functional molecule according to steps (a) to (c) of claim 1 be conducted within the *same* reaction well — the *same* physical containment in a localized space. *Id.* at 29.

In Patent Owner's view, this interpretation of "one or more reaction wells . . . each of said reaction wells" was essentially dispositive of the challenges raised in the Petition. *See*, *e.g.*, Prelim. Resp. 2–3, 6–8, 13, 15–

17; Paper 14, 1, 7. That is because, Patent Owner argued, the asserted prior art discloses carrying out the synthesis steps (a) to (c) of claim 1 in *different* physical containers (e.g., reagent tubes, wells on a microtiter plate, etc.) for each bi-functional molecule. *See, e.g.*, Prelim. Resp. 2–3 ("All of Nuevolution's references synthesize compounds using *different* reaction vessels"). As we explained in the institution decision, however, we were not persuaded that was true for all the prior art references being relied upon by Petitioner and, in particular, we pointed to the cited teachings in Freskgård as also disclosing synthesis of particular bi-functional molecules in the *same* reaction well. Inst. Dec. 38–39.

Petitioner embraces the Board's preliminary finding that at least Freskgård teaches synthesis of bi-functional molecules in the same physical container (i.e., a well on a microtiter plate) and, thus, in the *same* reaction well. *See, e.g.*, Reply 1–4, 9, 11–13. But Petitioner also urges that a "well" is not limited to any specific number of reaction containers and with a "proper application" of the meaning of "wells," the Board should also reconsider the additional grounds added post-*SAS*. *Id.* at 30.

We have considered the evidence and the parties' respective arguments, but we find no reason sufficient to revise our construction of the claim terms in this Final Written Decision. Our claim construction analysis from the Institution Decision, which we apply here, is reproduced in substance below in Sections II.B.1–3. Following that analysis, we address Petitioner's argument in the Reply bearing on claim construction. *See infra* Section II.B.4.

1. The Parties' Pre-Institution Claim Construction Positions

Other than pointing to the definition of "well" in the '728 patent, the Petition does not otherwise address the meaning of "well," and Patent Owner asserted in its Preliminary Response that "no claim term requires express construction." Pet. 22; Prelim. Resp. 10. After the filing of the Preliminary Response, however, Petitioner requested briefing on the phrase "each of said reaction wells." Paper 12, 2–3. In particular, Petitioner disputed Patent Owner's assertions that claim 1, by reason of the "said reaction wells" language, requires synthesis of at least one bi-functional molecule in the same reaction vessel. *Id*. at 2. We authorized additional briefing from both parties on this issue. Paper 12; Paper 13; Paper 14.

In its additional briefing, Petitioner asserted that the '728 patent's definition of "well" disposes of Patent Owner's arguments. Paper 13, 1–3 (citing Ex. 1002, 5:1–22). According to Petitioner, although claim 1 "may *embrace* bifunctional molecule synthesis in a single container," the claim "is not so limited." *Id*. at 3. Rather, Petitioner argued that "'reaction wells' (as defined and claimed) can be any localized space that allows reaction components (e.g., the claimed linker molecules, molecule fragments, and oligonucleotide identifiers) to react as desired." *Id*. Thus, Petitioner argued, claim 1 also reads on making bi-functional molecules in "more than one container," which "can constitute a 'localized space' (and thus a 'well')" as long as the components for making one type of bi-functional molecule are kept separate from the components used to make other bi-functional molecules. *Id*.

Petitioner cited embodiments in the '728 patent where, Petitioner asserted, more than one container is used to synthesize bi-functional molecules. *See, e.g.*, *id*. at 4 (citing Example 12 as showing the addition of a

linker molecule and oligonucleotide identifiers in several PCR tubes for ligation, followed by transfer of the reaction products to Eppendorf tubes for addition of molecule fragments). Petitioner argued claim 1 must be interpreted to cover those embodiments, and that Patent Owner's assertions are flawed insofar as they seek to limit claim 1 to other embodiments in the '728 patent. *Id*. at 4–5. And, Petitioner argued, claim 1 requires neither "compatible conditions," nor prohibits intermediate "purification" or "isolation" steps. *Id*. at 6–7.

Patent Owner, in its additional briefing, argued that Petitioner's interpretation and lexicography argument overlooks the "each of said" language of claim 1. Paper 14, 1–3. According to Patent Owner, when read in its proper context, "the construction of 'each of said reaction wells' unambiguously means that the synthesis of any particular molecule according to steps (a) to (c) [of claim 1] is conducted within the *same* reaction well." *Id*. at 2 (bold font omitted). Patent Owner argued that, the express definition of "well" aside, the interpretation cannot "remov[e] the 'each of said' limitations" that precede the term "well" in the claim. *Id*. at 3–4 ("[N]othing in this definition leads to a construction of 'each of said reaction wells' where reactants for each molecule are conveyed to *different* wells for each of steps (a) to (c) . . . ."). Further, Patent Owner asserted, "[s]ome disclosed embodiments fall within the 'each of said reaction wells' limitations, while others do not." *Id*. at 5–6.

2. "one or more reaction wells . . . each of said reaction wells"

According to the Specification, the term "well" "defines a physical containment of reagents, molecule fragments, etc. in a localized space." Ex. 1002, 5:1–3; *see also* Pet. 22. The Specification explains that a "well"

may comprise, *inter alia*, the well of a microtiter plate, any container, a reagent tube, or a bead to which the reagents and molecules to be kept separated are attached. *Id*. at 5:3–6. This separation, while not necessarily absolute, "should preferably ensure that the major components of a given well are the desired components." *Id*. at 5:8–11. As a further example, the Specification explains that a "nanocompartment" where hybridization of oligonucleotide strands holds reactive groups of bi-functional molecules in proximity to each other may also be considered a "well." *Id*. at 5:11–22.

"[I]f the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history,"[8] we will accord the claim term that specified definition. *See CCS Fitness, Inc. v. Brunswick Corp*. 288 F.3d 1359, 1366 (Fed. Cir. 2002); *see also Paulsen*, 30 F.3d at 1480 ("Although an inventor is indeed free to define the specific terms used to describe his or her invention, this must be done with reasonable clarity, deliberateness, and precision."). We interpret the term "well" in the manner defined by the '728 patent. It means "a physical containment of reagents, molecule fragments, etc. in a localized space." Ex. 1002, 5:1–3. And, as the Specification explains, it may be a well on a microtiter plate, a reagent tube, or the like, or even a nanocompartment where the desired components are physically contained in a localized space for a reaction to take place. *Id*. at 5:4–22.

But the definition of "well" alone does not resolve the claim construction dispute here. Steps (b) and (c) of claim 1 use the phrase "*each*

[8] The parties do not identify, nor do we find, any relevant portions of the prosecution history specific to interpretation of the "each of said reaction wells" phrase.

of said reaction wells," thus referring back to the "one or more reaction wells" in step (a). *Id*. at 137:4–10 (emphasis added).

We give effect to all claim terminology, including the "each of said" language preceding "reaction wells" in steps (b) and (c). *Merck & Co. v. Teva Pharm. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) ("A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so."). The claim term "said" signals that there is antecedent basis in the claim for the "said" claim term. *See* MPEP § 2173.05(e). We agree with Patent Owner that the limitation "one or more reaction wells . . . each of said reaction wells" means that the synthesis of any particular bi-functional molecule according to steps (a) to (c) is conducted within the *same* reaction well because "said" indicates that the reaction wells of steps (b) and (c) are the same respective reaction wells as in step (a). Paper 14, 2.

This interpretation is reinforced by claim 1's further requirement that "the region of the oligonucleotide identifier added to each well in step c) which hybridizes to said template identifies the molecule fragment added to *the same well* in step b)." Ex. 1002, 138:14–17 (emphasis added). Accordingly, whether the reaction well of steps (a) – (c) (and (d)) wherein a particular bi-functional molecule is synthesized by a linker becoming attached to a respective molecule fragment and oligonucleotide identifier is, for example, a tube or a nanocompartment in that tube, it must be the *same* reaction well — the *same* physical containment and localized space. By contrast, a process where the linker and oligonucleotide are attached in a PCR tube, followed by transfer of the reaction products to an Eppendorf tube where attachment of the molecule fragment and linker occurs, involves

different reaction wells. And we are unpersuaded claim 1 encompasses such synthesis in different reaction wells.

We recognize, but are not persuaded by, Petitioner's contention that Patent Owner's reading of claim 1 is too narrow because it does not cover all the '728 patent's preferred embodiments. Paper 13, 4. As Patent Owner points out, "[t]he fact that one construction may cover more embodiments than another does not categorically render that construction reasonable." Paper 14, 5–6 (quoting *PPC Broadband, Inc. v. Corning Optical Commc'ns RF, LLC*, 815 F.3d 747, 755 (Fed. Cir. 2016)). Further, as confirmed by the Federal Circuit, "the claims of the patent need not encompass all disclosed embodiments." *TIP Systems, LLC. V. Phillips & Brooks/Gladwin, Inc.*, 529 F.3d 1364, 1373 (Fed. Cir. 2008). That is particularly true when, as here, "to construe the claim term to encompass the alternative embodiment[s] . . . would contradict the language of the claim[]," i.e., "each of said reaction wells." *Id*.

Petitioner does, however, persuade us that claim 1 does not include any "compatible conditions" requirement, or exclude an intermediate "isolation" or "purification" step in carrying out steps (a)–(c) (and (d)). Paper 13, 6–7. Claim 1 is open-ended and uses the transitional phrase "comprising" to introduce these steps. Also, the Specification repeatedly discloses that steps (a) through (d) "may be performed in any order." *See, e.g.*, Ex. 1002, 2:67, 9:12. Thus, for instance, a linker could be added first (step (a)), followed by the oligonucleotide identifier (step (c)), with the two becoming attached according to step (d). Nothing in this sequence precludes purifying the intermediate reaction product, with the proviso that the step of adding the molecule fragment (step (b)), when taken, must occur in the *same* well as steps (a), (c), and (d).

3. "template"

Petitioner proposed an interpretation for the term "template." Pet. 22–23. That term appears only in the following phrase of claim 1: "the region of the oligonucleotide identifier added to each well in step c), which hybridizes to said *template* identifies the molecule fragment added to the same well in step b)." Ex. 1002, 138:13–17 (emphasis added).[9] Petitioner asserted that, under the broadest reasonable interpretation consistent with the Specification, "a POSA would understand the term 'template' to be 'an entity capable of binding carrier molecule(s) to bring molecule fragment(s) into reactive proximity with another reactive group.'" Pet. 23 (quoting Ex. 1015 ¶¶ 91–95).

The term "template" is not expressly defined in the '728 patent. In support of Petitioner's proposed interpretation, as "an entity capable of binding carrier molecule(s) to bring molecule fragments(s) into reactive proximity with another reactive group," Petitioner cited numerous disclosures from the Specification further explaining the term. Pet. 22–23; *see, e.g.*, Ex. 1002, 8:20–24, 11:12–17, 71:3–8. Petitioner also cited extrinsic evidence (Dr. Winssinger's testimony) explaining how the ordinarily skilled person would understand the term "template" as used in the patent and claim. Ex. 1015 ¶¶ 93–95. We find that the cited evidence is consistent with Petitioner's proposal. During trial, Patent Owner did not

[9] Although the phrase "said template" appears in this portion of claim 1, the term "template" does not appear elsewhere in the claim, thus a specific antecedent basis is lacking. *Compare* Ex. 1002, 138:13–17 *with* Ex. 1001, 135:57–60 (reciting an earlier step of "[c]ontacting the resulting bifunctional molecule(s) . . . with one or more templates each capable of hybridizing to at least one of the oligonucleotide identifiers added in step c)").

challenge Petitioner's proposal or explain why it is incorrect. Prelim. Resp. 10. Accordingly, consistent with our Decision on Institution, we interpret "template" as "an entity capable of binding carrier molecule(s) to bring molecule(s) into reactive proximity with another reactive group."

4. Petitioner's Claim Construction Argument In Reply — "one or more reaction wells . . . each of said reaction wells"

Petitioner argues that, although it "advances no new theory" in its Reply (Paper 32, 1), it further explains that the term "well" is defined by two functions: "*containment*" and "*separation*." Reply 1, 3. These are not structural, Petitioner argues, and if the functions are maintained during carrier synthesis to obtain the molecules one desires, the "said reaction wells" limitation is met. *Id.* at 4.[10] Here again, Petitioner argues that the type or number of physical reaction vessels is irrelevant if the desired reagents are reacted and the desired products obtained. *Id.*; Tr. 9:3–10:22.

We find no persuasive rationale to revise our claim construction of "one or more reaction wells . . . each of said reaction wells" and remain

[10] Patent Owner argues the Board should exclude Petitioner's Reply under Rule 42.23(b) because "Petitioner did not raise the current 'functional' claim construction arguments" in the Petition or in its seven pages of additional claim construction briefing. Paper 31, 1. The claim construction issue was already thoroughly briefed pre-institution. Moreover, Petitioner's argument that a "well" should be interpreted with a focus on function, not structure is merely a slight twist on Petitioner's earlier arguments such that the thrust of Petitioner's argument is still largely the same. Accordingly, rigid application of Rule 42.23(b) to exclude the Reply is not justified on this record. The Reply also invokes certain claim construction opinions on the "said reaction wells" phrase provided for the first time in Dr. Winssinger's second declaration. Ex. 1030 ¶¶ 5–12. This extrinsic evidence is both untimely and insufficient to persuade us that claim 1 carries a meaning that is inconsistent with a plain reading of the claim in light of the Specification.

unpersuaded that Petitioner's functional interpretation is correct for the reasons explained above. Also, a well is a physical structure defining a localized space where the synthesis of the encoded molecules takes place. The '728 patent's examples of wells are *physical* structures — a "well of a microtiter plate," a "container," a "reagent tube," etc. Ex. 1002, 5:1–8.[11] The Specification does not identify an exhaustive and closed list of all example structures that might be considered a "well." But that does not convince us that, where multiple physical structures each representing a localized space are used to synthesize a particular encoded molecule (e.g., adding and reacting a linker and molecule fragment in a well on a microtiter plate, and then moving the reaction products to an Eppendorf tube for addition and reaction with an oligonucleotide identifier), that the claimed steps (a)–(c) occur in the *same* reaction well as required. Petitioner points us to no disclosure in the '728 patent where such a transfer between *different* physical structures for the key synthesis steps is described as taking place in the *same* reaction well.

Finally, as discussed further below, upon consideration of the evidence in this trial record, we conclude claim 1 is unpatentable over the asserted prior art even under the allegedly *narrower* interpretation of the claim applied in the Decision on Institution and this Final Decision. We are persuaded that the preponderance of the evidence shows that at least Freskgård discloses synthesis of particular bi-functional molecules in the same reaction well, or in multiple reaction wells, as we have construed the

[11] Each of the example structures for a "well" listed in the definition section is also identified in a singular, not plural, form. There is no disclosure of a "well" as including wells on a microtiter plate, containers, or reagent tubes, etc. Ex. 1002, 5:1–22.

claim phrase "one or more reaction wells . . . each of said reaction wells." Because the claim is unpatentable under this construction, it would also be unpatentable under the broader construction described in Petitioner's Reply where, based on Petitioner's argument, the type and number of physical structures in which the molecules are synthesized is inconsequential. In short, resolution of whether we should adopt the broader interpretation urged by Petitioner is not necessary or decisive in demonstrating that claim 1 is unpatentable based on several grounds presented in this Petition.

C. Principles of Law

To show anticipation, each and every claim element, arranged as in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359 (Fed. Cir. 2008). The prior art need not, however, use the same words as the claims in order to find anticipation. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009). To the contrary, it is permissible to take into account not only the literal teachings of the prior art reference, but also the inferences the skilled artisan would draw from the reference. *Eli Lilly and Co. v. Los Angeles Biomedical Res. Inst. at Harbor-UCLA Med. Ctr.*, 849 F.3d 1073, 1074–75 (Fed. Cir. 2017); *In re Preda*, 401 F.2d 825, 826 (CCPA 1968).

A claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious to the person of ordinary skill in the art at the time of the invention. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). "If a person of ordinary skill in the art can implement a predictable variation [of the claimed subject matter from what is taught and suggested in the prior art], § 103 likely bars its patentability." *Id*. at 401.

The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of obviousness.[12] *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. "[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine elements in the way the claimed new invention does." *Id.*

D. Grounds Based on Freskgård (Grounds 4–6, 11, and 14)

In this Section, we address Petitioner's challenge to claim 1 as anticipated by, or over obvious over, Freskgård (Grounds 4 and 5). We also address here the challenges based on Freskgård combined with one of Pedersen, Franch '929, or Franch '427 (Grounds 6, 11, and 14, respectively).

1. Overview of Freskgård

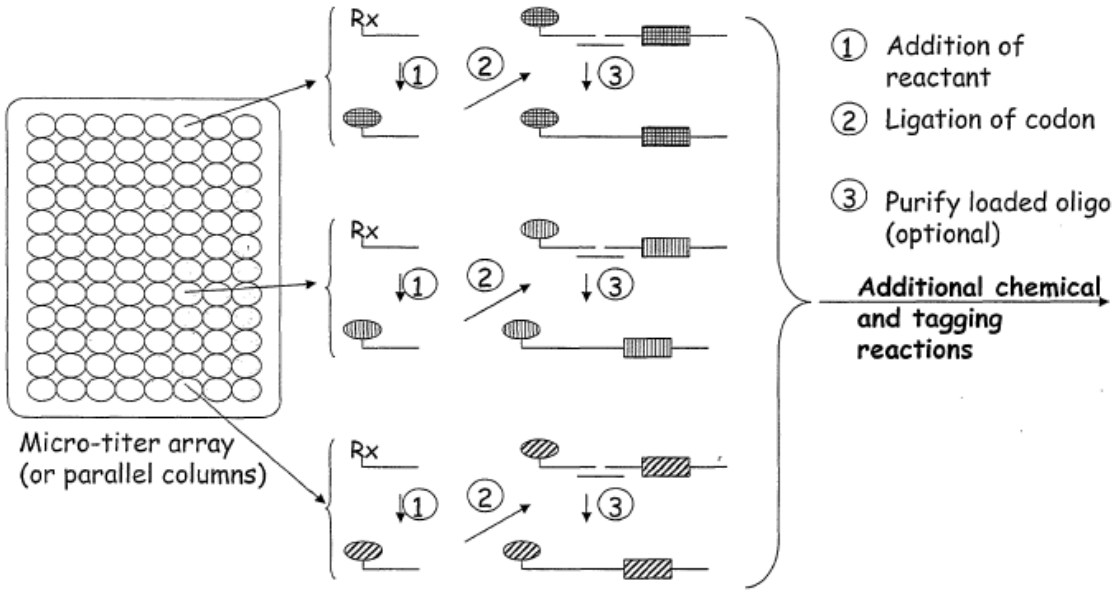
Freskgård "relates to a method for obtaining a bifunctional complex comprising [a] display molecule part and a coding part," as well as "a method for generation of a library of bifunctional complexes." Ex. 1003, 1:10–13. Freskgård teaches these libraries may be formed by so-called "Mode 1" (one-pot synthesis) and "Mode 2" (split-and-mix synthesis) methods, or "advantageous[ly]" through combinations of these methods. *Id.* at 11:18–12:16, 27:12–29, 35:30–36:34.

[12] Neither party submitted evidence of secondary considerations in this case.

Freskgård teaches the synthesis of various types of building blocks and bi-functional molecules in the formation of a library of complexes. *See*, *e.g.*, *id*. at 5:29–6:17, 95:5–13, Figs. 1–2, 11–13. According to Freskgård, "[a] functional entity attached to a nucleic acid may be referred to [] as a building block and specifies a chemical entity in which the functional entity is capable of being reacted at the chemical reaction site." *Id*. at 5:32–34. Freskgård discloses "[t]he oligonucleotide of the building block may or may not hold information as to the identity of the functional entity." *Id*. at 6:1–2. Further, in embodiments, the building block comprises an "anti-codon identifying the functional entity." *Id*. at 6:5.

Embodiments for synthesizing bi-functional molecules and libraries of molecules are illustrated in, for example, Figures 11–13 of Freskgård (e.g., mode 2 or split-and-mix synthesis). Figure 13 is reproduced below.

Fig. 13



Id. at Fig. 13.[13] Figure 13 shows a 96-well microtiter plate to the left and, to the right, a process for forming bi-functional molecules. *Id*. at 95:5–32. More specifically, Freskgård teaches a reactive group (Rx) attached to an oligonucleotide (horizontal line) is dispensed into the variety of the wells. *Id*. at 95:25–27. Then, "[i]n a first step, the reactive group in each compartment is reacted with a reactant, in a second step a codon oligonucleotide and a splint is added together with a ligase to ligate covalently the codon oligonucleotide to the reacted nascent bifunctional complex, and in a third step the ligation product is recovered." *Id*. at 27–30. According to Freskgård, "[t]he content of the wells may subsequently be combined and used as a library of bifunctional complexes or recycled for another round of reaction and addition of tag." *Id*. at 95:30–32; *see also id*. at Figs. 11–12,[14] 93:11–95:22). Freskgård discloses further embodiments for forming bi-functional carrier molecules according to a Mode 2 synthesis. *See*, *e.g.*, *id*. at 133:15–140:4 (Example 7), 151:10–154:6 (Example 9).

Freskgård also discloses examples of Mode 1 synthesis including a "three-strand" procedure that employs an "assembly platform" (i.e., template) to which bi-functional carrier molecules may hybridize. *Id*. at Fig.

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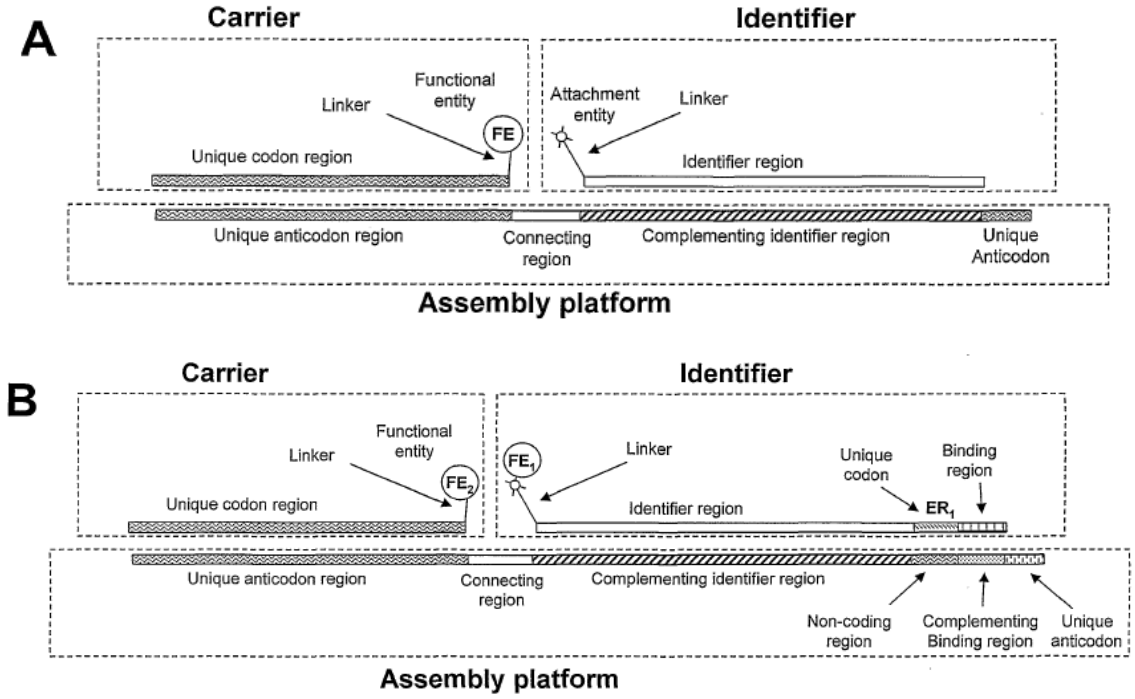
[13] As we find in the art and as explained by Dr. Winssinger, in depicting bi-functional molecules, particular shading (or hatch marks) is used to show correspondence between the relevant fragments and oligonucleotide/codon identifiers that encode such fragments. *See*, *e.g.*, Ex. 1003, Figs. 12–14; Ex. 1015 ¶¶ 45, 64, 480; Ex. 1004, Fig. 5A.

[14] Freskgård teaches that "Fig. 13 outlines an embodiment with the encoding and reaction step reversed compared to the embodiment shown in Fig. 12." Ex. 1003, 95:24–25. In other words, in Figure 12, the reactant (e.g., codon-specific drug fragment) is added and attached to the reactive group/linker after attachment of a codon-oligonucleotide. *Id*. at Fig. 12, 95:5–22.

7, 26:4–16, 92:18–26. This procedure is illustrated in Freskgård's Figure 7, which is reproduced below.

Figure 7.



Id. at Fig. 7. Figure 7 shows that "[t]he identifier and building block [carrier] can be assembled on an assembly platform," to allow for functional entity transfer from the carrier molecule to the attachment entity of the identifier. *Id*.; *see also id*. at 26:4–16, 92:18–26. Freskgård teaches "[t]he assembly platform [] contains a unique anticodon region with a specific sequence . . . [that] will anneal [i.e., hybridize] to the unique codon region in the carrier." *Id*. at 26:10–13;[15] *see also id*. at 127:23–129:11, 133:16–140:18, 143:4–144:16.

[15] Freskgård further teaches "[t]he unique anticodon [on the platform] can either be identical to the unique anticodon region or a shorter or longer sequence . . . [and] [t]he sequence of the unique anticodon can be used to decode the unique anticodon region. This will obtain the unique codon region which codes for the functional entity." *Id*. at 26:18–24.

2. Analysis: Anticipation by Freskgård (Ground 4)

Petitioner asserts that claim 1 is unpatentable under § 102 as anticipated by Freskgård. Pet. 69–87; Reply 23–24, 36–37. Petitioner also relies on Dr. Winssinger's Declarations. Ex. 1015; Ex. 1030. Petitioner cites substantial evidence and provides argument that each of the steps, and all limitations, in claim 1 are disclosed in Freskgård. Pet. 11–13, 69–87; Ex. 1015 ¶¶ 410–450, 550–552; Reply 5–28, 36–37; Ex. 1030 ¶¶ 16–54. Patent Owner argues that this challenge should be denied because Freskgård does not disclose all the limitations of claim 1.[16] Prelim. Resp. 31–37; Resp. 8–29. We discuss the evidence and the parties' arguments further below.

We begin by addressing the parties' arguments as to claim 1's disputed limitations, and then address Petitioner's argument and our assessment that Freskgård teaches the additional limitations of claim 1, which Patent Owner does not specifically dispute are disclosed in Freskgård.

i. "one or more reaction wells . . . each of said reaction wells"

This limitation is relevant in particular to steps (a)–(d) of claim 1, which is part of what Petitioner characterizes, as shorthand, the "carrier synthesis" steps. Pet. 24–26. As described above (Section II.B.), the key dispute here is whether the asserted prior art discloses that particular bi-functional (carrier) molecules are synthesized according to the claimed steps in the *same* reaction well.

[16] In its Preliminary Response, Patent Owner also argued that institution on Ground 4 should be denied on a discretionary basis under 35 U.S.C. § 325(d) because Freskgård was before the Examiner during prosecution. Prelim. Resp. 30–31. We did not exercise our discretion to deny institution on that basis. *See* Inst. Dec. 36–37.

Patent Owner contends Ground 4 does not account for the "each of said reaction wells" language of claim 1. Prelim. Resp. 31. Patent Owner initially focuses on the Petition's citation of Examples 7 and 9 of Freskgård as satisfying the so-called "carrier synthesis steps," and Patent Owner argues those examples "do[] not prepare molecules within the same reaction well." *Id*. at 31–35 ("Example 7 therefore uses four separate reactions separated by isolation steps and four separate reaction vessels, with different solvents and vastly different scales.") ("Example 9 therefore uses four separate reactions separated by isolation steps and four separate reaction vessels, with different solvents and different pH."). In short, Patent Owner contends those examples describe *different* reaction wells to prepare particular bi-functional carriers and, thus, do not meet claim 1's requirement for synthesis in the *same* reaction well. *Id*. at 31–35; Resp. 11–12, 17.

As we explained at institution, Patent Owner's argument was persuasive as to Examples 7 and 9 of Freskgård, and we found that Petitioner had not met its burden in showing adequately that *those* examples describe performing steps (a)–(d) of claim 1 in the *same* reaction well. Inst. Dec. 38. But Freskgård's teachings — and Petitioner's challenge — are not based solely on Examples 7 and 9. To the contrary, Petitioner repeatedly also identifies, *inter alia*, Figures 12 and 13 (and the descriptions related to those Figures) as evidencing a disclosure of steps (a)–(d). Pet. 69–71, 73, 78, 85–86. We find Figures 12 and 13 show a 96-well microtiter plate to the left, and illustrate the synthesis of a particular bi-functional molecule (or molecules) by combining a linker, molecule fragment, and oligonucleotide identifier (e.g., fragment-specific codon) in individual wells to the right. Ex. 1003, Figs. 12–13, 95:5–32. In describing Figure 12, Freskgård

discloses that "[i]n each well or in a selected number of wells, the process to the right [combining and reacting the linker, etc.] occurs." *Id*. at 95:5–6.

As to Freskgård's Figures 12 and 13, Patent Owner raises several arguments during trial. Resp. 7–29. First, Patent Owner argues Petitioner gave an insufficient explanation of how those figures satisfied the claimed steps and that Petitioner's misunderstanding that claim 1 required synthesis in the same reaction well is fatal to Petitioner's challenge. *Id.* at 10–18. Second, Patent Owner argues Petitioner's expert admitted Figures 12 and 13 do not disclose conducting reactions within the same reaction well, and, Patent Owner contends, those figures depict multi-container reactions. *Id.* at 8–9, 18–23. And third, Patent Owner contends, Figures 12 and 13 do not disclose adding a linker according to step (a) of claim 1. *Id.* at 24–29. We address these arguments in turn.

We do not agree with Patent Owner's first argument, related to Petitioner's alleged misunderstanding of the claim and defects in the explanations in the Petition. Patent Owner made this argument before, and we considered and tacitly rejected it when we instituted trial on various Freskgård-based grounds. *See* Paper 14, 7 (Patent Owner argued Petitioner's failure to "take the elementary step of addressing the 'each of said [reaction wells]' claim limitations . . . is fatal to Nuevolution's Petition."). Nor does Petitioner's alleged misunderstanding of claim 1 *exclude* the claim interpretation applied by Patent Owner, which interpretation the Board adopted and applies in this Final Written Decision. As explained above, Petitioner has consistently argued that the claim encompasses synthesis of particular bi-functional carrier molecules in a single container, or many. *See*, *e.g.*, Paper 13, *passim*.

Neither does the Petition's focus on Examples 7 and 9 versus Figures 12 and 13 of Freskgård demonstrate that the Petition is fatally defective. It is true, as Patent Owner argues, that much of the Petition's analysis and explanation is devoted to Freskgård's Examples 7 and 9. Resp. 17.[17] But prior art is generally read and considered in its entirety for all that it discloses. *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1547, 1554 (Fed. Cir. 1983); *In re Hedges*, 783 F.2d 1038, 1041 (Fed. Cir. 1986) (holding "the prior art as a whole must be considered"). And here, the Petition explicitly and repeatedly cites Freskgård's Figures 12 and 13 and the accompanying disclosures related to those figures, it provides snapshots of Figure 13, which the Petition describes as an illustrative embodiment of Mode 2 (carrier) synthesis, and it maps the claimed steps to, among other things, Figures 12 and 13 (and the related disclosures) in claim chart form. Pet. 10–13, 69–71, 73, 78, 85–86.[18] That those citations or explanations

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[17] In Reply, Petitioner asks the Board to revisit Examples 7 and 9 because, Petitioner argues, some of the four separate reactions described for those examples are not germane to the claimed steps (asserting that the first reaction relates to linker preparation and the fourth reaction is a deprotection step occurring after admixture). Reply 19. According to Petitioner, Freskgård does not affirmatively disclose that the key reactions (the second and third) in these examples require transfer to a new vessel. *Id.* at 20–22. This is a close call when other embodiments described in Freskgård (*see, e.g.*, Ex. 1003, 95:5–32, and Figs. 12–13) are considered; but we remain unpersuaded on this record that those specific examples (7 and 9) describe synthesis in the same reaction well as claimed. *See, e.g.*, Ex. 2005 (Winssinger Tr.), 185:4–9, 187:7–188:11 (declining to "fit" Example 9 into Fig. 12)); *but see id.* at 184:4–185:2 (testifying that Example 9 is connected to Fig. 11, and that Figs. 12–14 are more specific examples of the synthesis described in Fig. 11).

[18] Patent Owner contends that, in describing Figure 13, "the petition asserts that the process shown in Figure 13 is conducted in 'different wells.'"

may have included less detail as compared to what the Petition provides for Examples 7 and 9 of Freskgård does not demonstrate that the Petition itself was defective in identifying a disclosure in the prior art of bi-functional molecule synthesis in the same reaction well as claimed. Indeed the Board, citing the relevant teachings in Freskgård and where those teachings were identified in the Petition, understood sufficiently this basis of Petitioner's challenge. Inst. Dec. 36–42; Reply 5 n.1. Without putting form over substance, we did not and cannot ignore the cited disclosures related to Figures 12 and 13, a plain reading of which suggests synthesizing particular bi-functional molecules in the same reaction well on a microtiter plate, simply because they were not emphasized to the same degree as other cited disclosures of Freskgård. The dispositive issue now is whether, by a preponderance of the evidence developed through trial, the Petition and the Board's Institution Decision is correct that Freskgård does disclose synthesis of encoded molecules in the same reaction well. *Genzyme Therapeutic Prods. L.P. v. Biomarin Pharma. Inc.*, 825 F.3d 1360, 1367 (Fed. Cir. 2016) ("The purpose of the trial in an *inter partes* review proceeding is to give the

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Resp. 14. That contention is somewhat misleading. The Petition, at the portion Patent Owner cites, states that Figure 13 "illustrates a Mode 2 embodiment where different carrier molecules are prepared in different wells, by attaching different molecule fragments ('reactants') and single-stranded oligonucleotide identifies ('codons') to a linker molecule." Pet. 69–70. The term "different" as used there relates to preparation of several different bi-functional molecules with different molecule fragments, etc., each in different wells of the microtiter plate. Indeed, Figure 13 depicts preparation of at least three different bi-functional molecules on the plate. "Different," in that context, does not mean that several different wells were used or needed for making any particular bi-functional molecule (e.g., any one of the three shown).

parties an opportunity to build a record by introducing evidence—not simply to weigh evidence of which the Board is already aware.").

We also do not agree with Patent Owner's second argument that Freskgård does not disclose conducting reactions within the same reaction well. Patent Owner contends that Dr. Winssinger "admitted that Figures 12 and 13 do not disclose conducting reactions within the same reaction well." Resp. 8–9. According to Patent Owner, "Dr. Winssinger is correct that the figures do not specify whether the depicted reactions are conducted in the same or different physical containers." *Id.* at 9 (citing, e.g., Ex. 2005 (Winssinger Tr. 165:3–5 and 174:20–22 (relating to Figures 12 and 13 being a "high level schematic representation."))). Patent Owner further cites Dr. Winssinger's testimony that the chemistry shown in "Figure 12 . . . <u>is not restricted to a particular container format</u>." Resp. 9 (citing Ex. 2005, 198:17–25) (Patent Owner's emphasis).

But these alleged admissions are simply consistent with Dr. Winssinger's (and Petitioner's) position that Freskgård's bi-functional carrier molecules can be synthesized in a single reaction well or in many wells. Critically lacking in Patent Owner's cited questioning of Dr. Winssinger is whether the skilled person, reading Figures 12 and 13 *and the accompanying disclosures specifically related to those figures*, would have understood Freskgård as disclosing synthesis of particular bi-functional molecules in a single reaction well on a microtiter plate. As Petitioner points out in response, "PO tries hard to spin Dr. Winssinger's testimony otherwise, [but] the fact remains that Figure 12 'schematically shows a 96 well microtiter plate to the left[, where] **<u>[i]n</u>** <u>each well</u> or **<u>in</u>** <u>a selected number of wells</u>, the process to the right occurs[.]'" Reply 16–17 (quoting Ex. 1003, 95:5–6) (brackets and emphasis added by Petitioner)). Indeed,

Dr. Winssinger makes clear that, when the accompanying descriptions are considered, "Freskgård explicitly provides that the processes shown on the right of these figures [the synthesis of the bi-functional molecules] occur *within* individual microtiter wells." *See, e.g.*, Ex. 1030 ¶ 36 (citing Ex. 1003, Fig. 12, 95:5–6); *see also* Ex. 1030 ¶¶ 33–34 (Dr. Winssinger explaining how Patent Owner cited his testimony out of context).

Dr. Winssinger also testified that Freskgård "teaches all permutations," including that reactions of the linker, molecule fragment, and oligonucleotide "can all happen *simultaneously*; hence, in the same microtiter." Ex. 2005, 222:7–21 (emphasis added); *see also* Ex. 2005, 211:17–22 ("If the whole process happens simultaneously within a microtiter plate, this would be . . . the simplest example where it happens in the 'said well.'"). As Dr. Winssinger's testimony makes clear, "Freskgård's Mode 2 synthesis may proceed according to a one-step protocol (simultaneous reaction of reactants and tags in the same compartment), and various multi-step protocols (a tagging reaction prior to or subsequent to a reactant reaction in the same compartment)." Ex. 1030 ¶¶ 19–20; *see id.* ¶¶ 22–23. And, as Petitioner points out, this is consistent with Freskgård's express teachings that the reaction events may occur "simultaneously," thus further reinforcing that Freskgård does teach synthesis of bi-functional molecules in the *same* reaction well. Reply 8–9; *see, e.g.*, Ex. 1003, 95:1–3 ("[T]he general principle for split-and-mix [Mode 2] is disclosed, in which the reaction of the small molecule fragment and the chemical reaction site occurs prior to the encoding step. Obviously, the events can occur in the reverse order or *simultaneously*.") (emphasis added).

Patent Owner further asserts that Freskgård's Figures 12 and 13 do not disclose synthesis in the same reaction well because those figures

"contain arrows with the arrowheads pointing *away* from the wells of the microtiter plate." Resp. 18. According to Patent Owner, when arrowheads point away from the plate, this commonly "indicate[s] that contents are removed from the well." *Id.* at 18–23 (citing Exs. 2007, 2008).

We do not agree that this is always so, especially in light of express disclosure to the contrary. First, as discussed above, Patent Owner's argument is inconsistent with what Freskgård teaches — that the reactions shown to the right (as indicated by the arrows pointing to the right) may *occur in each well*. Ex. 1003, 95:5–6. With respect to Figures 12 and 13 (and related Figure 14), when the contents of the wells are combined or dispensed into separate wells, Freskgård expressly states so. *Id.* at 95:20–22, 95:34–96:2.[19] On this record, figures and descriptions in other references (Exs. 2007 and 2008) that post-date Freskgård by several years do not persuade us that Freskgård does not mean what it says.[20] Second,

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[19] Patent Owner asserts that Freskgård's Figure 14 uses an arrow pointing toward the microtiter plate, consistent with common use, to show materials added to the wells. Resp. 21. Patent Owner is correct inasmuch as Figure 14 shows and Freskgård describes adding the reaction products from Figure 13 to a new microtiter plate, for subsequent rounds of synthesis (addition of further codon-specific drug fragments and codon oligos). Ex. 1003, Fig. 14, 95:34–96:12 ("Initially, the combined contents of the wells from the embodiment of Fig. 13 are dispensed in separate wells."). But that does not mean the subsequent addition of further fragments and codon oligos (as shown by right-facing arrows in Figure 14) requires a removal from that plate or the wells therein. The more reasonable interpretation, consistent with the description for related Figures 12 and 13, is that the right-facing arrows identify the chemical reactions occurring within the individual wells of the plate in this subsequent synthesis round.

[20] Petitioner argues that Exhibits 2007 and 2008 should be excluded as irrelevant, for lacking probative value, and as hearsay. Paper 35, 5–9. We

Dr. Winssinger testifies that the arrows shown in these more-recent references do not reflect "any common practice in the art" that would contradict Freskgård's explicit teachings made years earlier. Ex. 1030 ¶¶ 34–37. And third, against Freskgård's explicit teachings and Dr. Winssinger's testimony on the same, Patent Owner provides no countervailing testimony or other sufficiently persuasive evidence to demonstrate that a skilled artisan would interpret Freskgård consistent with Patent Owner's arguments.

Patent Owner's third argument, regarding the absence of a linker molecule in Freskgård's cited disclosures, is also unavailing. Resp. 24–29. The Petition explains, for example, that Figure 13 and the related disclosure describe attachment of a molecule fragment ("reactant") and a single-stranded oligonucleotide identifier ("codon") to a linker molecule. *See*, *e.g.*, Pet. 69–70; Ex. 1003, Fig. 13, 95:24–32; *see also id.* at Figs. 11–12, 93:11–94:8, 95:5–22. In this context, it is reasonably clear that Petitioner was relying on Figure 13's "nascent bifunctional complex," which comprises a reactive group (Rx) and oligonucleotide portion as satisfying the claimed "linker" in step (a) of the claim. Ex. 1003, Fig. 13, 95:24–32; Inst. Dec. 38–39.[21] As disclosed in Freskgård, this "nascent bifunctional complex" is

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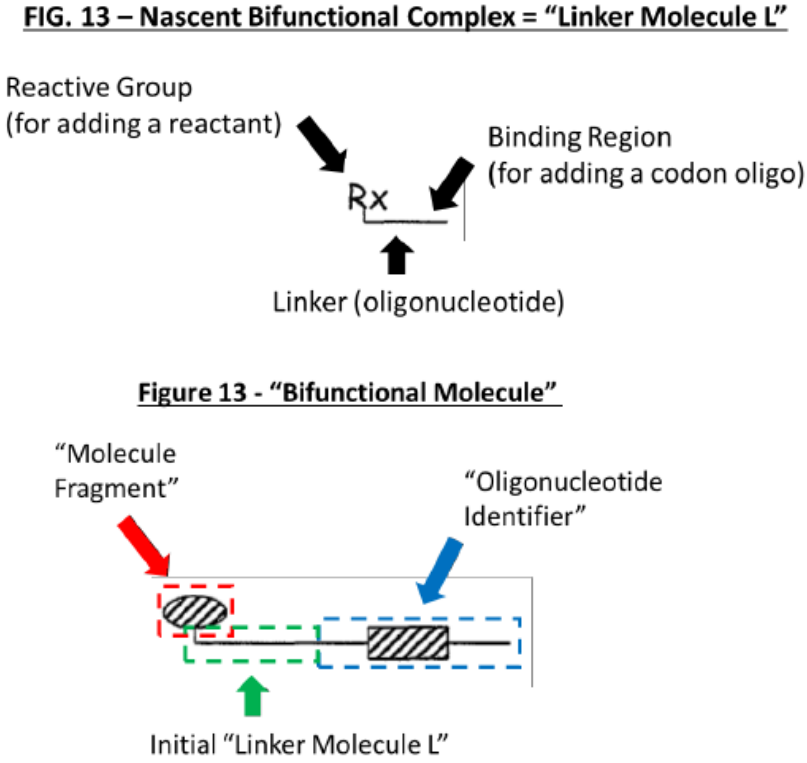
discuss this argument below (Section III) when addressing Petitioner's Motion to Exclude.

[21] Similarly, we understood from a plain reading of Freskgård and the Petition that Petitioner was pointing to the initial bi-functional molecule in Figure 12 as representing a linker to which subsequent drug fragments and drug-specific codon oligos are attached — thus forming an encoded molecule specific for that drug fragment. Ex. 1003, 95:5–22, Fig. 12. The analysis provided in this section for the nascent bi-functional complex in Figure 13 applies similarly to the initial bi-functional molecule in Figure 12.

added to wells on the microtiter plate and subsequently reacted "in each compartment [i.e., well]" with a reactant and a codon oligo that is specific to the reactant. Ex. 1003, Fig. 13, 95:24–32.

Petitioner also responded to Patent Owner, marking up portions of Freskgård's figures to illustrate more clearly Petitioner's positions on the so-called "linker." Some of those marked-up figures are reproduced below:



Reply 15–16; *see also* Ex. 1030 ¶¶ 28–31, 42–43. In the annotated figures above, Petitioner highlights the linker, as well as the molecule fragment and oligo identifier for a representative bi-functional molecule depicted in Freskgård's Figure 13. Patent Owner argues we should exclude Petitioner's Reply for including new argument about, *inter alia*, Figure 13 under Rule

42.23(b). Paper 31, 2–3.[22] On this record, however, we are not persuaded that providing a further annotation of a drawing that was repeatedly relied upon in the Petition for the same claim limitations addressed in the Reply is impermissible new evidence or argument. To the contrary, Petitioner's annotations are consistent with the Board's understanding of Petitioner's challenge and the Institution Decision, and they are directly responsive to Patent Owner's contentions that a "linker" is missing in Freskgård's Figure 13. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080–82 (Fed. Cir. 2015) (holding that rebuttal evidence may be appropriate when needed to explain, repel, counteract, or disprove an adversary's evidence); *see also Anacor Pharm., Inc. v. Iancu*, 889 F.3d 1372, 1380–81 (Fed. Cir. 2018) (holding that an IPR petitioner "may introduce new evidence after the petition stage" in some circumstances such as documenting knowledge skilled artisans would bring in interpreting the prior art); *see also* 37 C.F.R. § 42.23(b) (stating "reply may only respond to arguments raised in the corresponding . . . patent owner response").[23]

Patent Owner argues that a "bifunctional molecule" and a "linker molecule" are not the same thing. Resp. 25–26. Patent Owner notes that the '728 patent provides different definitions for those terms. *Id.* We disagree. The "Linker L" is broadly defined in the '728 patent as an entity with

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[22] We do not specifically rely on Petitioner's marked-up version of Figure 11 here, so Patent Owner's argument for exclusion of that figure is moot. Paper 31, 2–3.

[23] Although we disagree that the further annotations to Freskgård's Figures 12 and 13 are "new evidence," we note that Patent Owner never requested a sur-reply and declined to participate in the Oral Hearing where we had granted Patent Owner the opportunity to provide further argument on the merits and Rule 42.23(b) issues. Paper 29; *supra* Section I.A.

reactive groups adapted for reacting, respectively, with a molecule fragment and an oligonucleotide fragment. Ex. 1002, 4:24–29. Patent Owner does not persuade us that a linker molecule excludes a nascent bi-functional complex (like described in Freskgård's Figure 13), which itself includes reactive groups for attaching to a reactant (molecule fragment) and an oligonucleotide fragment (codon). Ex. 1003, Fig. 13, 95:24–32; Reply 13–16; Ex. 1030 ¶¶ 41–42; Tr. 26:3–28:14. Moreover, as Petitioner points out, the '728 patent cites Freskgård as describing an "enablement" of a stage 1 synthesis according to the invention, which "enablement" starts with a "nascent bifunctional complex" similar to Freskgård's Figure 13. Reply 16; Ex. 1002, 29:64–65, 30:45–55 (describing a stage 1 process using "[a] nascent bi-functional complex comprising a reactive group [for addition of molecule fragments] and a priming site for enzymatic addition of an oligonucleotide identifier . . . ."). This disclosure in the '728 patent, Petitioner contends, therefore uses a nascent bi-functional complex as a linker molecule. Reply 16. On this record, we agree with Petitioner that a "nascent bifunctional complex" qualifies as the linker in claim 1's step (a).

We find that Petitioner has shown by a preponderance of the evidence on this trial record that Freskgård discloses the so-called carrier synthesis steps — steps (a) through (d) of claim 1. This includes, for the reasons explained above, a disclosure of the limitation "one or more reaction wells . . . each of said reaction wells" because Freskgård discloses that particular encoded molecules are synthesized in the *same* reaction well. Also, as discussed above, we find that the cited disclosures meet step (a) of claim 1 because, *inter alia*, a "linker" as claimed encompasses Freskgård's nascent bi-functional complexes to which particular molecule fragments and codon oligos are attached in individual wells of a microtiter plate. Petitioner cites

substantial evidence that, if the carrier synthesis steps (a) through (d) are met in Freskgård, so are the first three "wherein" clauses of claim 1. Pet. 24–26, 78, 86; Ex. 1003, Figs. 12–13, 95:5–32; Ex. 1015 ¶¶ 138–141, 410–450, 550–552; Ex. 1030 ¶¶ 16–54; Reply 11–18. Patent Owner does not dispute this (separate from its arguments that we found unpersuasive related to satisfaction of steps (a)–(d) of claim 1). Accordingly, we also find that a preponderance of the evidence in this record demonstrates that Freskgård discloses claim 1's first three wherein clauses.

ii. "template"

This limitation appears in the final "wherein" clause of claim 1. Patent Owner argued pre-institution that Petitioner had not established anticipation of the "template hybridization" limitation. Prelim. Resp. 35.[24] More specifically, Patent Owner argued Petitioner did not demonstrate how Freskgård "discloses an oligonucleotide identifier that hybridizes to a template in a manner that 'identifies the molecule fragment added to the same well in step b),' as required by Claim 1." *Id*. But, as we pointed out at institution (Inst. Dec. 39), this argument presumed Petitioner's challenge is based on synthesis of encoded molecules as described only in Freskgård's Examples 7 and 9. It is not. We find that Freskgård discloses synthesis of encoded molecules in the *same* reaction well. *See supra* Section II.D.2.i. Moreover, by combining Mode 2 encoded-molecule synthesis (e.g., like shown in Figure 13) with a Mode 1 (one-pot/template) synthesis, such as

[24] Patent Owner did not make this argument in its Response during trial. We address it here, however, because the Board agreed to consider Patent Owner's arguments in the Preliminary Response related to grounds added post-*SAS* (like Ground 4). Paper 24.

shown in Figure 7 of Freskgård, we find the "template-hybridization" (the final "wherein" clause) limitation of claim 1 is met. We find Freskgård suggests "[m]ode 1 methods that employ codon-specific hybridization, and thus provide for template-encoded synthesis" (Pet. 81–82 (citing, e.g., Ex. 1003, Fig. 7); *see also* Ex. 1015 ¶¶ 443–446), which Petitioner demonstrates persuasively satisfies the template hybridization required in claim 1. Pet. 20.

Upon consideration of the entire trial record, we find Petitioner has established by a preponderance of the evidence that Freskgård discloses a "template" and the subject matter in the final wherein clause of claim 1.

iii. Additional limitations

Petitioner contends that Freskgård discloses the remaining limitations of claim 1. In particular, the Petition cites teachings in Freskgård meeting step (e) of claim 1, which recites "[c]ombining the contents of said one or more reaction wells." Ex. 1002, 138:1–2; *see*, *e.g.*, Pet. 26–27, 78, 86; Ex. 1003, Figs. 12–13, 95:20–22, 95:30–32 ("The content of the wells may subsequently be combined and used as a library of bifunctional complexes or recycled for another round of reaction and addition of tag."); Ex. 1015 ¶¶ 414, 438–439, 550–552.

Patent Owner does not address the merits of Petitioner's assertions regarding the remaining limitations. After having reviewed Petitioner's arguments and evidence related to these additional limitations in claim 1, we are persuaded and adopt those arguments and evidence in this Final Written Decision. *In re Nuvasive*, 841 F.3d 966, 974 (Fed. Cir. 2016) (explaining that the Board need not make specific findings on claim limitations that Patent Owner does not dispute are disclosed in the prior art). We, therefore,

find that the preponderance of the evidence on this record establishes that Freskgård discloses the remaining limitations of claim 1.

Even if Freskgård discloses all the limitations in claim 1, Patent Owner argues Petitioner "relies on a mosaic of numerous unrelated disclosures" in Freskgård, and that this "patchwork anticipation position violates *Net MoneyIN* and fails to demonstrate anticipation." Prelim. Resp. 36. On this point, we agree with Patent Owner.

Although we find that all the limitations of claim 1 are taught in Freskgård, Petitioner's challenge requires picking and choosing from among distinct embodiments and disclosures to get there. This includes the Mode 2 (split-and-mix) synthesis described in, for example, Freskgård's Figure 13 with the Mode 1 (one-pot/three-strand template) synthesis shown in, for example, Figure 7. *See supra* Section II.D.2.i–ii. That Freskgård discloses advantages in combining Mode 1 and Mode 2 synthesis methods does not describe sufficiently the exact arrangement of claim 1 for purposes of anticipation. Ex. 1003, 35:30–36:34; *Net MoneyIN*, 545 F.3d at 1370–71 ("[I]t is not enough [for anticipation] that the prior art reference . . . includes multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention."); *In re Arkley*, 455 F.2d 586, 587 (CCPA 1972) (explaining that anticipation requires the art "clearly and unequivocally disclose the claimed [invention] or direct those skilled in the art to the [invention] without *any* need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference."). On this record, Petitioner has not persuasively identified in Freskgård a single-anticipatory description having all the limitations of claim 1 arranged as in the claim. Accordingly, we find Petitioner did not

meet its burden to establish, by a preponderance of the evidence, that claim 1 is unpatentable under § 102 by Freskgård.

3. Analysis: Obviousness over Freskgård (Ground 5)

Petitioner asserts that claim 1 is unpatentable under § 103 as obvious over Freskgård. Pet. 87–89. Petitioner incorporates its analysis of the disclosures of Freskgård related to Ground 4. *Id.* Petitioner also points out that Freskgård teaches that Modes 1 and 2 are "advantageously combinable" because the Mode 2 (split-and-mix) strategy provides for versatile reactions, and the Mode 1 (one-pot/template) strategy provides for high local concentrations of reactants. *Id.* at 87–88; *see also* Ex. 1015 ¶¶ 528–529 (explaining that a mode 1 synthesis also provides the advantage of ensuring a "close proximity" and "high local concentration promoting the reaction even for reactants having a relatively low tendency to react") (citing Ex. 1003, 36:28–34). Petitioner contends that, when preparing large libraries according to "Mode 2 + Mode 1 combinations," the skilled artisan "would have been motivated to simultaneously prepare many different carriers on a microtiter plate having 10, 20, 50 or even 100 wells," and "would have a reasonable expectation of success in preparing, screening and amplifying libraries containing 100 . . . to well over 10,000, (10^8-10^{10}) encoded products, i.e., templated molecules." Pet. 88–89; *see also* Ex. 1015 ¶¶ 526–535, 550–554.

Patent Owner argues that Freskgård does not disclose all the limitations of claim 1. Resp. 7–29. Patent Owner also contends the Petition fails to demonstrate a "motivation to arrive at a process conducted within the same reaction well according to steps (a) to (d)" and "fails to provide any motivation to modify Figures 12 and 13 . . . to arrive at the process recited in

steps (a) to (d) of claim 1." *Id.* at 29–30. Patent Owner argues that, even if a motivation existed, the Petition "does not establish that a person of ordinary skill in the art would have had an expectation of success in modifying [Freskgård's] multistep syntheses . . . to be conducted within the same reaction vessel." *Id.* at 30–31. Further to that point, Patent Owner argues, the processes depicted in Freskgård's Figures 12 and 13 (and other Freskgård disclosures) do not provide "specific experimental instructions or even directions" for carrying out synthesis of particular bi-functional molecules in the same reaction well as claimed. *Id.* at 33–35.

We find that Petitioner has shown, by a preponderance of the evidence on this record, that claim 1 would have been obvious over Freskgård. We discuss below.

As explained above regarding Ground 4, Petitioner has cited substantial evidence that persuades us that Freskgård discloses all the limitations of claim 1. At least Figures 12 and 13 and the related disclosures about those figures in Freskgård teach preparation of distinct bi-functional molecules in the same reaction well, and the satisfaction of steps (a)–(d) of claim 1. Ex. 1003, Figs. 12–13, 95:5–32; Pet. 10–13, 69–71, 73, 78, 85–89; Ex. 1030 ¶ 36; Reply 12–13, 15–16; *see also* Ex. 1030 ¶¶ 28–31, 42–43.

Petitioner also demonstrates persuasively that Freskgård discloses "templated" synthesis that satisfies claim 1's final wherein clause, and that Freskgård provides an express reason for combining Mode 1 (template-based) and Mode 2 (split-and-mix) techniques. Pet. 81–82 (citing, e.g., Ex. 1003, Fig. 7), 88–89. Indeed, we find Freskgård teaches "it may be advantageous to use a combination of a one-pot synthesis strategy (mode 1) and a split-and-mix strategy (mode 2), because each of mode 1 and mode 2 has its virtues." Ex. 1003, 36:1–7. Such virtues include, *inter alia,* "the

possibility of having the reactive groups in close proximity" in Mode 1 and the "versatile reactions" provided with a Mode 2 synthesis. *Id.*; *see also id.* at 36:26–34 ("The intermediate library [formed using split-and-mix] is used for the generation of a final library using a one-pot [template] strategy."). Dr. Winssinger echoes these advantages (and others) in his testimony, including the ability to provide and screen large libraries of encoded molecules by combining the techniques. *See*, *e.g.*, Ex. 1015 ¶¶ 526–535, 550–554.

Patent Owner's arguments about Freskgård not disclosing the limitations of claim 1 are unpersuasive for the reasons explained above. *Supra* Section II.D.2.i–iii. Patent Owner's argument about picking and choosing between embodiments in Freskgård, although persuasive with respect to anticipation, fails to rebut the challenge based on obviousness. Indeed, "picking and choosing may be entirely proper in the making of a 103, obviousness rejection." *Arkley*, 455 F.2d at 587. And here, Petitioner has identified several evidence-backed reasons that we find explain why the skilled person would have predictably and advantageously combined various techniques (mode 2 and mode 1) to arrive at the subject matter of claim 1. Pet. 87–89; *see also*, *e.g.*, Ex. 1003, 36:1–34; Ex. 1015 ¶¶ 526–535 (e.g., describing reasons to use bi-functional carrier molecules in combination with a three-strand assembly (template) platform (like shown in Fig. 7)).

Patent Owner argues that Petitioner fails to show a "motivation" to arrive at a process for synthesizing bi-functional molecules in the same reaction well as claimed. Resp. 29–30. But, as Petitioner points out and as the Board has explained above, we find Freskgård expressly teaches such synthesis. Reply 23–24 ("at least Figures 11-13 . . . specifically teach synthesis in the same reaction well according to claim 1."); Ex. 1003, Figs.

12–13, 95:5–32. Hence, the motivation comes directly from Freskgård and "[a] POSA would not need to modify them [e.g., the methods shown in Figures 12 and 13] in any way." Reply 23–24; Ex. 1030 ¶ 56.[25]

Patent Owner argues that an expectation of success in conducting bi-functional molecule synthesis within the same reaction well is also lacking. Resp. 30–35. Yet that argument is unavailing. We are unpersuaded the skilled artisan would lack a *reasonable* expectation of success in carrying out the synthesis of particular bi-functional molecules in individual wells of a microtiter plate when that is precisely what Freskgård instructs may be done. Ex. 1003, Figs. 12–13, 95:5–32; *see also id.* at 95:1–3 (teaching that the synthesis of the components can occur "simultaneously"); Ex. 1030 ¶ 57; Ex. 2005, 211:17–22 ("If the whole process happens simultaneously within a microtiter plate, this would be . . . the simplest example where it happens in the 'said well.'"). Teachings in patents and prior art publications (like Freskgård) are presumed to be enabled for the ordinarily skilled person absent persuasive evidence to the contrary, which Patent Owner does not provide. *See In re Antor Media Corp.*, 689 F.3d 1282, 1287–88 (Fed. Cir. 2012); *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1355 (Fed. Cir. 2003).

Neither are we persuaded "specific experimental instructions" are required to give the skilled artisan a reasonable expectation of success in carrying out the reactions Freskgård teaches may be carried out in the same

[25] Petitioner also states that motivation to synthesize bi-functional molecules in "a single reaction vessel" comes from "Freskgård's teaching that the 'addition of a[n] [identifier] tag may occur prior to, subsequent to, or simultaneous with the reaction' of a molecule fragment (Ex-1030, ¶57; Ex-1003, 28:14-15 (emphasis added), 95:1-3.)." Reply 24.

reaction well. Resp. 33–35. We find that the portions of the '728 patent cited by Patent Owner as exemplifying bi-functional molecule synthesis in the same reaction well include a level of detail comparable to Freskgård's detail related to Figures 12 and 13. Paper 14, 5 (citing Ex. 1002, Fig. 1, Abstract, 2:27–32, 8:39–44, 53:26–30, 59:53–60:2). This suggests, consistent with Petitioner's argument, that skilled artisans would have known how to carry out the synthesis of bi-functional molecules in individual wells of a microtiter plate (as taught in Freskgård) without detailed instructions. *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994) (holding "the Board's observation that appellant did not provide the type of detail in his specification that he now argues is necessary in prior art references supports the Board's finding that one skilled in the art would have known how to implement the features of the references."); Reply 8–9; Ex. 1030 ¶ 20; Ex. 1003, 27:15–29. So too, Patent Owner's argument that the skilled artisan would have no expectation of success based on Freskgård rings hollow where the '728 patent itself invokes Freskgård's teachings to provide "enablements" of split-and-mix synthesis according to the invention, and where the '728 patent states that "any embodiment of bi-functional molecule synthesis described in said patent application [Freskgård] is applicable for stage 1 [split-and-mix/carrier] synthesis." Ex. 1002, 29:64–65, 30:45–55.

For the reasons above, upon consideration of the argument and evidence on this entire trial record, we find that Freskgård teaches or suggests all the limitations of claim 1, and that the skilled artisan would have had reason to practice the method of claim 1 with a reasonable expectation of success. Accordingly, we conclude that claim 1 is unpatentable under § 103 over Freskgård.

4. Freskgård Combinations (Grounds 6, 11, and 14)

Although not necessary to our ultimate determination regarding the patentability of claim 1, we address Grounds 6, 11, and 14 for completeness. We begin with overviews of Pedersen, Franch '929, and Franch '427. We then address Grounds 6, 11, and 14 as a group because, for each ground, the Petition similarly relies on Freskgård for teaching all the limitations except claim 1's final wherein clause related to hybridization of the oligonucleotide identifier to a "template." Pet. 90–93, 111–13, 123–26. For the final wherein clause, the Petition relies on any one of Pedersen, Franch '929, or Franch '427. *Id.* In other words, for each of Grounds 6, 11, and 14, the Petition cites Freskgård as teaching all the so-called carrier (Mode 2/split-and-mix) synthesis steps and cites Pedersen, Franch '929, or Franch '427 as teaching template-based synthesis techniques, which the Petitioner argues are substitutes to the templated (Mode 1) synthesis in Freskgård and combinable with split-and-mix synthesis according to Freskgård's teachings.

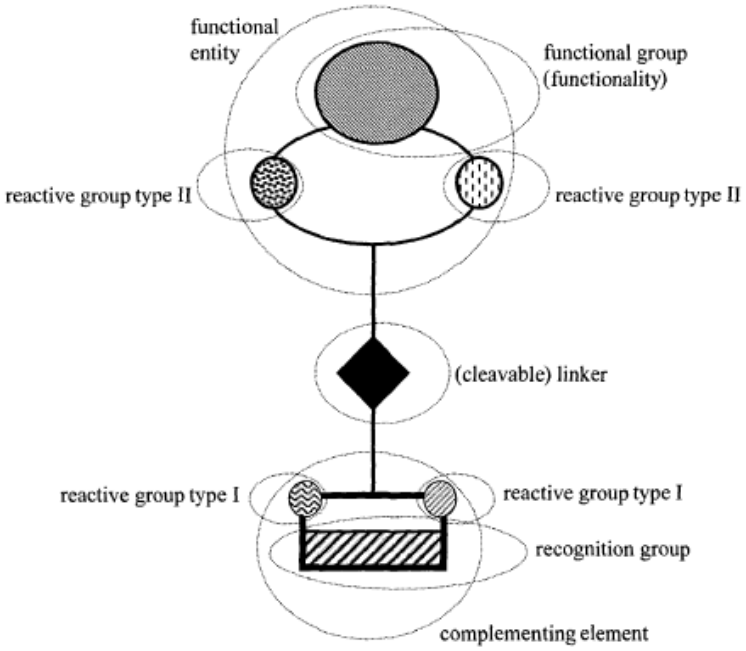
i. Overview of Pedersen

Pedersen relates to "a method for synthesizing templated molecules" that "allows the generation of libraries which can be screened for e.g. therapeutic activity." Ex. 1004, Abstract. Pedersen discloses:

> The templated molecules are preferably synthesized from building blocks comprising a functional entity comprising a functional group and reactive group capable of covalently linking functional groups and forming a templated molecule. The functional entity of a building block is separated from a complementing element by a cleavable linker, or a selectively cleavable linker. The complementing element is capable of complementing a predetermined coding element of the template, thus ensuring a one-to-one relationship between a coding element - or a complementing element - and a functional entity, or a functional group.

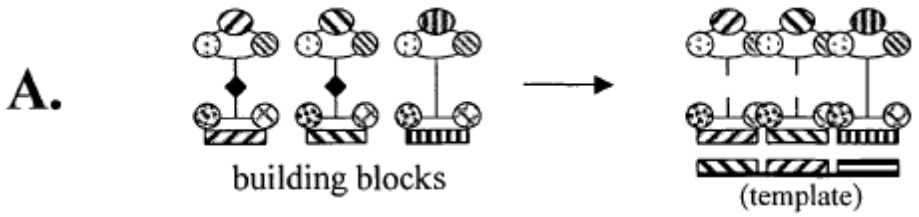
Id. at 13:18–26.

Representative building blocks are shown in Pedersen's drawings. Figure 3, for example, is reproduced below.



Id. at Fig. 3. Figure 3 shows a building block containing a functional entity, a cleavable linker, and a complementing element. *Id*.; *see also id*. at 27:15–25, Fig. 6. Pedersen discloses that "[t]he complementing element contains a recognition group that interacts with a complementary coding element (coding element not shown [in Fig. 3])." *Id*. at 27:19–21. An exemplary method of synthesizing building blocks is disclosed in Examples 107 and 108 of Pedersen. *Id*. at 298:13–303:32.

Pedersen also discloses using building blocks in a templated synthesis. *See*, *e.g*., *id*. at 298:13–299:11, 301:1–303:32, Fig. 5A, Fig. 31. Figure 5A, for example, shows a templated synthesis and is reproduced below.



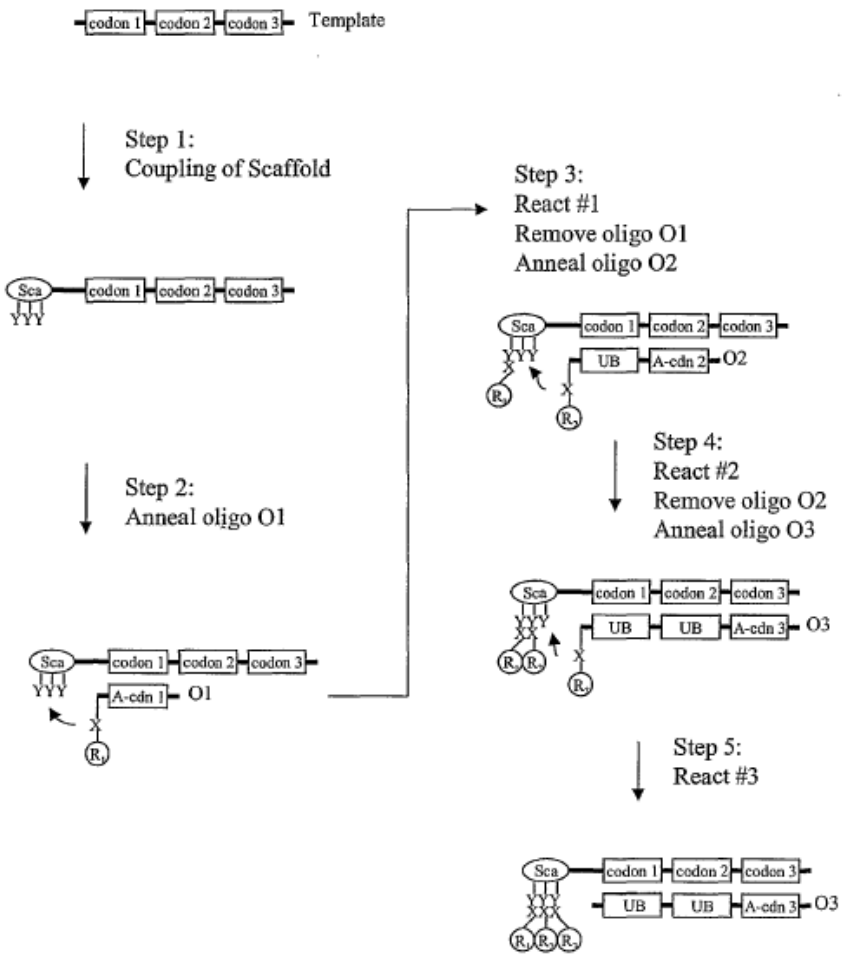
Id. at Fig. 5A. According to Pedersen, Figure 5A shows "[t]hree different complementing elements . . ., each linked to a specific functional entity [such as shown in the building blocks of Fig. 3]" and "[t]he right half of the figure includes the template which directs the incorporation of the building blocks by complementary base pairing [i.e., hybridization]." *Id*. at 28:4–9; *see also id*. at 47:23–48:2, Fig. 31, 301:29–303:17.

ii. Overview of Franch '929

Franch '929 relates to "a method for synthesizing a bifunctional complex . . . [that] comprises a template as well as a molecule, the synthesis of which being directed by the template," and the formation of a library of such complexes. Ex. 1005, Abstract. Franch '929 discloses "a template comprising two or more codons in sequence, a first pair of a molecular affinity pair, and a reactive group." *Id*. Further, the method of Franch '929 uses "two or more building blocks, each building block comprises i) an anti-codon capable of recognising a codon of the template, ii) a functional entity comprising at least one reactive group, and iii) a linker connecting the anti-codon and the functional entity." *Id*; *see also id*. at 4:2–26. Franch '929 teaches "contacting the template with a building block under conditions which allow specific hybridisation of the anti-codon of the building block to the codon of the template." *Id*. at 4:16–18.

Figure 1 of Franch '929, reproduced below, is a schematic representation of this hybridization between building blocks and a template.

Fig.1



Id. at Fig. 1. Figure 1 shows, *inter alia*, the step-wise hybridization of building blocks (oligos O1, O2, O3) to a template having a scaffold with reactive groups (Y) for accepting the transfer of molecule fragments (R_1, R_2, R_3) from the respective building blocks. *Id*.; *see also id*. at 52:18–55:2. After the template, which contains three codons, is coupled to a scaffold, "building block O1 is annealed to the template. The building block comprises the anticodon (A-cdn 1) which complements codon 1 of the template." *Id*. at 52:22–27. Then, "the functional entity [R_1] of the first building block is transferred to the scaffold by a direct reaction involving the

reactive groups X and Y." *Id*. at 52:30–32. The process continues similarly for building blocks O2 and O3 as shown. *Id*. at Fig. 1; *see also* Fig. 6.

Examples 1 and 2 of Franch '929 describe the preparation of building blocks, such as used in the process shown above. *Id*. at 72:1–75:32.

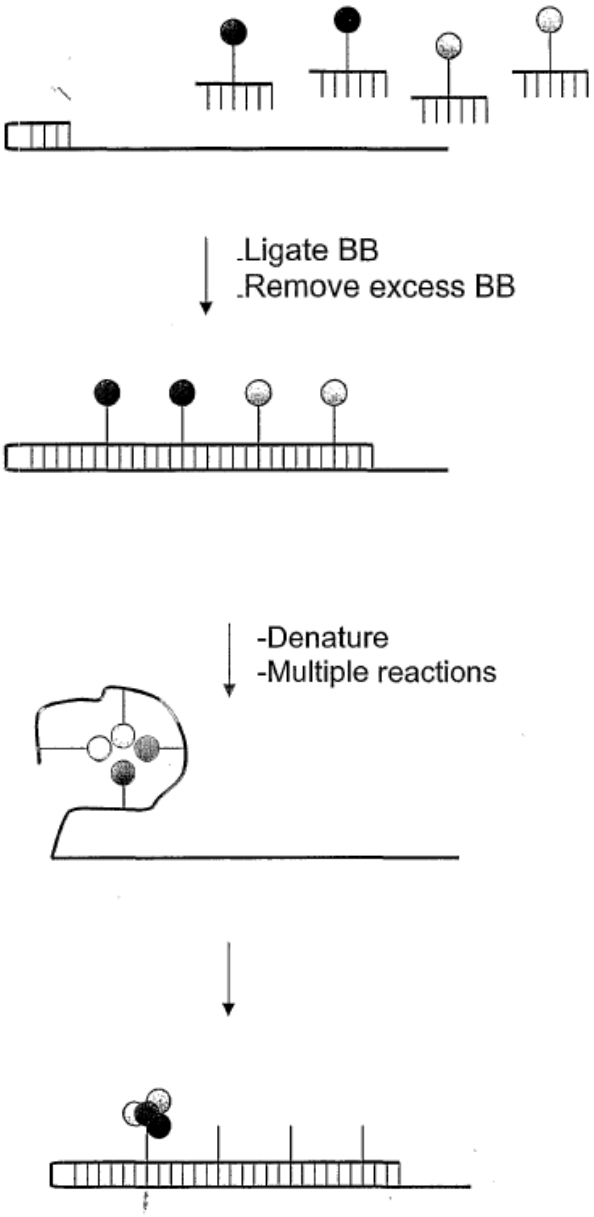
iii. Overview of Franch '427

Franch '427 "relates to a method for synthesizing a bifunctional complex comprising an encoded molecule and an identifier polynucleotide identifying the chemical entities having participated in the synthesis of the encoded molecule." Ex. 1016, Abstract; *see also id*. at 5:8–10.

Franch '427 discloses, *inter alia,* providing "at least one template comprising one or more codons capable of hybridising to an anti-codon, wherein said template is optionally associated with one or more chemical entities," and providing "a plurality of building blocks each comprising an anti-codon associated with one or more chemical entities." *Id*. at 5:14–20. After "hybridising the anti-codon of one or more of the provided building blocks to the template," the anti-codons may be linked and/or the template is linked with the anti-codon of at least one building block, thereby "generating an identifier polynucleotide capable of identifying chemical entities having participated in the synthesis of the encoded molecule." *Id*. at 5:22–28.

An example of this synthesis is shown in Figure 2 of Franch '427, in which multiple building blocks are combined on a template. *Id*. at 67:7–26.

Fig.2



Id. at Fig. 2. As shown in Figure 2, "a template comprising a hairpin loop is provided" and "[v]arious building blocks are added subsequently." *Id*. at 67:13–18. According to Franch '427, "[t]he anticodons [of the building blocks] are designed such that they align[] on the template under

hybridisation conditions," which "is directed by the sequence of the template." *Id*. at 67:18–20. The "anticodons are ligated together," and "the ligation product is made single stranded by inducing denaturing conditions," which then allows the chemical entities to react together and form the reaction product. *Id*. at 67:20–26; *see also id*. at Fig. 2.

Franch '427 provides a more detailed description of the chemical structure of building blocks capable of transferring a chemical entity. *See*, *e.g.*, *id*. at 49:9–50:16. Franch '427 discloses that this "building block is the subject of the Danish patent application No. PA 2002 01946 and the US provisional patent application No. 60/434,439 [(Ex. 1017) 'the '439 Application'], the content of which are incorporated herein in their entirety." Ex. 1016, 50:1–4. The '439 Application discloses a method for synthesis of this building block. Ex. 1017, 2:10–19, 16:16–17:28 (Example 3).[26]

iv. Analysis: Obviousness over Freskgård in Combination with Pedersen, Franch '929, or Franch '427

For Ground 6 (Freskgård in combination with Pedersen), Petitioner contends that Freskgård "teaches different Mode 2 split-and-mix techniques for preparing bi-functional molecules," thus providing carriers for templated reactions. Pet. 90–91 (citing Ex. 1003, Figs. 12–14; Ex. 1015 ¶¶ 559–560) (also cross-referencing evidence cited in support of Grounds 4 and 5). Petitioner also asserts that Pedersen "discloses methods of making DNA-encoded libraries using template-encoded synthesis." Pet. 90; *see also id.* at

[26] Patent Owner argued pre-institution that the '439 Application was not incorporated into Franch '427. Prelim. Resp. 54–56, 63. We concluded that the '439 Application (Ex. 1017) is incorporated in its entirety into Franch '427 for the reasons explained in the institution decision, which conclusion we maintain and incorporate here. Inst. Dec. 48–50.

50–51, 58–62, 64; Ex. 1015 ¶¶ 558, 572–573; *see also id.* ¶¶ 211–22, 273–275; Ex. 1004, Fig. 5A, Fig. 31, 298:13–26, 302:1–303:32.

Petitioner asserts that the ordinarily skilled person would recognize the template-encoded methods of Pedersen as a one-pot strategy (similar to Mode 1 synthesis in Freskgård). Pet. 92. Petitioner contends "a POSA would immediately appreciate that a library of Mode 2 carriers from [Freskgård] could be applied to template-encoded synthesis according to [Pedersen]." *Id.* at 91. According to Petitioner, "this is a simple substitution of one known element . . . for another" — bi-functional molecules prepared as in Freskgård for the bi-functional molecules (building blocks) in Pedersen. *Id.* at 91–92; Ex. 1015 ¶ 561. Moreover, Petitioner provides evidence that the skilled artisan would have expected that this modification would successfully provide large libraries (e.g., 10^8) of templated products, and would have been motivated to make this modification because Pedersen's template-based technique would benefit from Freskgård's Mode 2 techniques, which provide improved reaction versatility. Pet. 92–93; Ex. 1015 ¶¶ 562–563; Ex. 1003, 36:1–14, 36:26–35 (Freskgård teaching advantages of combining Mode 1 and Mode 2).

Petitioner provides substantially the same analysis for Grounds 11 and 14, but swaps the teachings of Franch '929 and Franch '427 related to templated reactions for those of Pedersen. *See* Pet. 111–13, 123–26; *see also* Ex. 1015 ¶¶ 577–580, 582–583, 628–634.

Patent Owner argues that Grounds 6, 11, and 14 fail because of the same alleged deficiencies of Freskgård asserted above on Ground 5. Resp. 35–37. For Ground 6, for example, Patent Owner contends:

> The Board relied on Exhibit 1003 (Freskgård) for the disclosure of steps (a)-(d) of claim 1. *See* Paper 15 (Institution Decision) at

> 38-39. However, for the reasons discussed above regarding Ground 5, the petition fails to establish that Exhibit 1003 (Freskgård) discloses at least steps (a)-(d) of claim 1. . . . Furthermore, the petition fails to establish that Exhibit 1003 (Freskgård) discloses or suggests at least step (a) of claim 1. . . . Ground 6 does not cure any of the deficiencies of Ground 5. As a result, Ground 6 does not establish obviousness of the challenged claims.

Resp. 35–36. Patent Owner makes substantially the same argument for Grounds 11 and 14. *Id.* at 36–37.

Patent Owner's arguments related to the alleged deficiencies of Freskgård are addressed above (Section II.D.2–3) and are similarly unavailing with respect to Grounds 6, 11, and 14.

We find, based on a preponderance of the evidence on this record, that each of Pedersen, Franch '929, and Franch '427 disclose, among other things, template-directed synthesis methods.[27] When combined with bi-functional molecules synthesized according to Freskgård's Mode 2 (split-and-mix) technique as proposed by Petitioner, we find that the cited references teach all the limitations of claim 1. We further find that the skilled artisan would have had reason to combine the split-and-mix and template-directed techniques to obtain the known advantages of each of

[27] *See, e.g.*, for Pedersen (Ex. 1004, Fig. 5A, 28:4–9, 47:23–48:2, Fig. 31, 301:29–303:17; Pet. 94–96; Ex. 1015 ¶¶ 211–214); for Franch '929 (Ex. 1005, Figs. 1, 6; Pet. 111–13; Ex. 1015 ¶¶ 574–581); for Franch '427 (Ex. 1016, Fig. 2, 67:7–26; Pet. 119, 123–26; Ex. 1015 ¶¶ 627–634). We further note that, when describing a suitable "stage 2 synthesis (templated synthesis)," the '728 patent states that "[a]ny embodiment of bi-functional molecule synthesis described in said patent application [Franch '929] is applicable for the stage 2 synthesis of bi-functional molecules." Ex. 1002, 35:19–21, 36:19–23.

those techniques. Ex. 1003, 36:1–14, 36:25–35; Pet. 92–93. And, we also find the skilled artisan would have had a reasonable expectation of success in carrying out the method claimed, including synthesis of bi-functional molecules in the same reaction well as described in Freskgård, for reasons already explained. *Supra* Section II.D.3. For the above reasons, we thus conclude that claim 1 is unpatentable based on Grounds 6, 11, and 14.

E. The Additional Grounds (Grounds 1–3, 7–10, 12, and 13)[28]

Each of these "additional grounds" was added to the trial proceeding following the Supreme Court's decision in *SAS*. Paper 24. Initially, we denied each of these grounds in the Institution Decision for a similar reason. That is, we determined that Petitioner had not met its burden to demonstrate by a reasonable likelihood that the prior art relied upon in support of these grounds disclosed synthesis of encoded molecules in the *same* reaction well as required by claim 1. *See, e.g.*, Inst. Dec. 34–35 (determining for Ground 2 that "Patent Owner's explanation of Examples 107 and 108 of Pedersen as indicating these reactions take place in *different* wells is persuasive."); *see, e.g.*, Prelim. Resp. 23 (explaining how these examples suggest, on balance, different wells are used in view of the different solvents, scales, and the isolation, purification, and removal steps described).

The additional grounds present further bases on which claim 1 of the '728 patent is alleged to be unpatentable. Inst. Dec. 53.[29] Because we have determined that Petitioner has shown by a preponderance of the evidence

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[28] Ground 4 (anticipation by Freskgård) was also one of the additional grounds added post-*SAS*, but Ground 4 is addressed above. Section II.D.2.
[29] Although we pointed out that these grounds were seemingly cumulative, we did not deny them or the Petition for efficiency purposes because trial was to proceed initially only on the Freskgård-based grounds. Inst. Dec. 53.

that claim 1 is unpatentable as obvious over Freskgård or Freskgård combined with other references (Grounds 5, 6, 11, 14), we need not reach the unpatentability of claim 1 over the several other references and combinations thereof as proposed in the additional grounds. *Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984) (holding that once a dispositive issue is decided, there is no need to decide other potentially dispositive issues); *see, e.g.*, *Formlabs Inc. v. Envisiontec, Inc.*, IPR2017-01258 (PTAB Oct. 5, 2018) (Paper 41, 17).

But even turning to the additional grounds, Petitioner makes essentially the same three arguments for these grounds in an attempt to convince the Board to reach a different result than reached in the Institution Decision (Paper 15). First, Petitioner argues that with a change to — or "proper application" of — the meaning of "reaction wells," the Board should revisit whether the references satisfy steps (a)–(d) of claim 1. *See, e.g.*, Reply 30, 33–36 (Grounds 2–3 (alleged anticipation and obviousness over Pedersen)). Second, Petitioner argues it is not as clear-cut from the prior art (as Patent Owner suggests) that these references synthesize encoded molecules in different reaction wells. *See*, *e.g.*, Reply 31, 33–34. For example, Petitioner argues that "changes to the solvent and pH between reactions do not necessitate a different reaction vessel" and that, for various reactions, "[t]here is no mention" of reaction intermediates "being transferred to new reaction vessels." *Id.*; *see also id.* at 37, 39, 42. And third, for the additional obviousness grounds, Petitioner argues that even if the cited reactions are carried out in separate vessels, "a POSA would have nonetheless found it obvious to conduct these reactions sequentially in the same vessel." *See, e.g., id.* at 38 (Ground 8 (obviousness over Gouliaev '994)); *see also id.* at 36, 44. Petitioner contends it would have been

obvious to purify the intermediate reaction products and then return them to the same vessel for addition of other portions of the encoded molecule under suitable conditions. *See*, *e.g.*, *id.* at 38–39.

Petitioner's arguments are unpersuasive and we find, on this record, that the preponderance of the evidence does not demonstrate that claim 1 is unpatentable based on the additional grounds. First, we decline to change our claim construction or its "application" for reasons discussed above. *Supra* Section II.B. Claim 1 requires synthesis steps (a)–(d) be conducted in the same reaction well for particular bi-functional molecules, and Petitioner has not demonstrated sufficiently that the additional references describe such synthesis. Inst. Dec. 32–36, 44–46, 48–50; Prelim. Resp. 15–24, 26–28, 42–43, 48–49, 56–58; Ex. 1004, 298:13–303:32; Ex. 1007, 32:1–33:28; Ex. 1017, 16:16–17:28.

As for Petitioner's second argument, it might be the case that some of the cited reactions in the additional references are (or could be) conducted within the same reaction well. That is, however, not enough to show that all the limitations are disclosed in the relied-upon prior art. "Probabilities or possibilities" do not suffice to show that a claim limitation is present. *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981) ("The mere fact that a certain thing may result from a given set of circumstances is not sufficient."). It was Petitioner's burden to make an adequate showing in the Petition on this issue, but it did not do so. Indeed, even during the trial, Petitioner was unable to identify in the prior art (separate from Freskgård) any express disclosure of synthesizing encoded molecules according to steps (a)–(d) of claim 1 in the *same* reaction well as we have construed the phrase. Tr. 36:1–19.

Third, Petitioner's assertion that, assuming the additional references disclose synthesis in multiple reaction wells, it would have been obvious to modify that process and conduct such synthesis in a single reaction well is a new obviousness rationale provided for the first time in Petitioner's Reply. Under 37 C.F.R. § 42.23(b), we do not consider this new rationale here. Petitioner's "*Cf.*" citations to a few paragraphs buried among over six hundred in Dr. Winssinger's first declaration does not convince us otherwise. Reply 33, 39 (citing Ex. 1015 ¶¶ 266, 399); *see also* Reply 44 (citing Ex. 1015 ¶ 618).[30] We do not decide in this trial proceeding whether Petitioner's third argument is persuasive or backed with sufficient evidence in Petitioner's Reply. We simply find it goes beyond true rebuttal and amounts to a new rationale for modifying the references that was not set out adequately in the Petition. Hence it is not considered under Rule 42.23(b).

III. MOTION TO EXCLUDE

Petitioner moves to exclude five exhibits: Exhibits 2003, 2004, 2006, 2007, and 2008. Paper 35 (Pet. Mot.).

Exhibit 2003 is a press release, Exhibit 2004 is a paper co-authored by Dr. Winssinger, and Exhibit 2006 is a transcript of a conference call between the parties and the Board related to a discovery dispute. Petitioner argues that those exhibits are irrelevant and not cited or relied upon by Patent Owner its briefings. Pet. Mot. 2–5. Patent Owner responds that the exhibits

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[30] Even considering those cited portions of the first Winssinger declaration, at best, they suggest it may have been possible for an ordinarily skilled person to carry out the recited reactions in a single well, but they do not provide sufficient evidence or persuasive technical reasoning to demonstrate why the skilled person would have been motivated to make this modification.

are relevant for at least the purpose of maintaining a complete record of Dr. Winssinger's deposition. Paper 38, 1–4.

We do not affirmatively rely on any of Exhibits 2003, 2004, or 2006 in our determinations as part of the Final Written Decision. Patent Owner's Motion to Exclude those exhibits is, thus, dismissed as moot.

Exhibit 2007 is a technical paper authored by Dr. Winssinger and published in CHIMIA in 2013. Ex. 2007. It relates generally to methods for forming encoded molecules by tagging chemical entities with nucleic acids. *Id.* at 340. Exhibit 2008 is a technical paper related to methods for engineering zinc-finger arrays that was published in Nature Protocols in 2009. Ex. 2008, 1471.

Petitioner argues that both Exhibits 2007 and 2008 should be excluded as lacking relevance and because their probative value (if any) is outweighed by the danger of unfair prejudice and likelihood of confusing the issues. Pet. Mot. 6–9. Also, Petitioner argues, both exhibits contain out of court statements that should be excluded as hearsay. *Id.* at 7, 9; *see also* Paper 39, 3–5. Patent Owner responds that Exhibits 2007 and 2008 are relevant and admissible as support for Patent Owner's contention regarding an alleged common practice in the art about the use of arrowheads pointing away from a well to indicate the removal of the contents from the well. Paper 38, 4–8. Patent Owner further contends Exhibits 2007 and 2008 are relevant to rebut Petitioner's evidence about Freskgård's Figures 12 and 13 and whether the arrowheads there indicate the reactions take place in the same or different wells. *Id.* As for hearsay, Patent Owner argues those exhibits are "offered for what [each] teaches, not for the truth of the matter it asserts." *Id.* at 6, 8.

Petitioner's motion is denied with respect to Exhibits 2007 and 2008. Those exhibits are, at minimum, relevant as offered to counter Petitioner's

contentions and impeach Dr. Winssinger's opinions that a skilled person would interpret Freskgård's figures and disclosures as teaching synthesis of encoded molecules in individual wells of a microtiter plate. On this record, the fact that those exhibits post-date Freskgård and the '728 patent's putative priority date by many years goes to their weight, not admissibility. *See also Yeda Research v. Mylan Pharm. Inc.*, 906 F.3d 1031, 1041 (Fed. Cir. 2018) (noting that the Board correctly recognized that non-prior art evidence of what was known "cannot be applied, independently, as teachings separately combinable" with other prior art, but "can be relied on for their proper supporting roles," including "how one with ordinary skill in the art would have under-stood a prior art disclosure") (citation omitted). Nor are we persuaded the probative value of those exhibits is substantially outweighed by the risk of unfair prejudice or of confusing the Board. As explained above, we considered those exhibits but simply found them unpersuasive in the face of Freskgård's express teachings and Dr. Winssinger's opinions about Freskgård. *Supra* Section II.D.

Finally, on hearsay, we are unpersuaded that Exhibits 2007 and 2008 qualify as hearsay because they are not being offered for the truth of the matters asserted therein. Fed. R. Evid. 801(c)(2). The exhibits include technical descriptions related to arrows and reactions in wells on a microtiter plate that differ from Freskgård's figures and related descriptions. Whether the content of the wells described in Exhibits 2007 and 2008 are, in fact, transferred to different wells is not determinative. The exhibits do not themselves state that the use of arrows in this way is the "common practice in the art." *See, e.g.*, Resp. 19. We recognize that Patent Owner draws that conclusion from Exhibits 2007 and 2008 but, against all the other evidence

in the entire trial record, Patent Owner's conclusion is little more than unpersuasive attorney argument. *Supra* Section II.D.

In sum, Petitioner's Motion to Exclude is dismissed as moot for Exhibits 2003, 2004, and 2006, and denied for Exhibits 2007 and 2008.

IV. MOTION TO AMEND

Patent Owner filed a Contingent Motion to Amend (Paper 20), Petitioner opposed this motion (Paper 26) and Patent Owner filed a Reply (Paper 30). As noted above (Section I.A.), shortly before the Oral Hearing, Patent Owner requested that its Contingent Motion to Amend be withdrawn. Paper 41; Paper 42 (granting request). The Board granted Patent Owner's request and the Contingent Motion to Amend was withdrawn. Paper 42.

V. CONCLUSION

For the reasons above, we determine Petitioner has established, by a preponderance of the evidence, that claim 1 of the '728 patent is unpatentable under § 103 over Freskgård (Ground 5), and further over Freskgård combined with Pedersen, Franch '929, or Franch '427 (Grounds 6, 11, and 14). By a preponderance of the evidence on this record, we conclude that Petitioner has not established that claim 1 of the '728 patent is unpatentable on the additional grounds (Grounds 1–4, 7–10, 12, and 13).

Petitioner's Motion to Exclude Evidence is denied as to Exhibits 2007 and 2008, and dismissed as moot on Exhibits 2003, 2004, and 2006.

Patent Owner's Contingent Motion to Amend has been withdrawn.

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has proved by a preponderance of the evidence that claim 1 of U.S. Patent No. 8,951,728 is unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude (Paper 35) is *dismissed* as moot for Exhibits 2003, 2004, and 2006, and *denied* for Exhibits 2007 and 2008; and

FURTHER ORDERED that, because this is a Final Written Decision, parties seeking judicial review of this Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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