United States Court of Appeals for the Federal Circuit

DAVID NETZER CONSULTING ENGINEER LLC,
Plaintiff-Appellant

v.

SHELL OIL COMPANY, SHELL CHEMICAL LP, SHELL OIL PRODUCTS COMPANY LLC,
Defendants-Appellees

2015-2086

Appeal from the United States District Court for the Southern District of Texas in No. 4:14-cv-00166, Judge Lynn N. Hughes.

Decided: May 27, 2016

ANTHONY MATTHEW GARZA, Charhon Callahan Robson & Garza, P.C., Dallas, TX, argued for plaintiff-appellant. Also represented by STEVEN CHASE CALLAHAN.

KATHLEEN M. SULLIVAN, Quinn Emanuel Urquhart & Sullivan, LLP, New York, NY, argued for defendants-appellees. Also represented by KEVIN ALEXANDER SMITH, San Francisco, CA; JOSHUA L. SOHN, Washington, DC; CHARLES BRUCE WALKER, JR., Norton Rose Fulbright US LLP, Houston, TX; JAYME PARTRIDGE, Patterson & Sheridan LLP, Houston, TX.

Before PROST, *Chief Judge*, LOURIE and TARANTO, *Circuit Judges*.

LOURIE, *Circuit Judge*.

David Netzer Consulting Engineer LLC ("Netzer")* appeals from the decision of the United States District Court for the Southern District of Texas granting summary judgment of noninfringement of the asserted claims of U.S. Patent 6,677,496 ("the '496 patent"). *David Netzer Consulting Eng'r LLC v. Shell Oil Co.*, No. 4:14-cv-00166, ECF No. 45 (S.D. Tex. Aug. 26, 2015) ("*Decision*"). For the reasons that follow, we *affirm*.

BACKGROUND

Netzer owns the '496 patent, entitled "Process for the Coproduction of Benzene from Refinery Sources and Ethylene by Steam Cracking," which describes a process for the coproduction of ethylene and purified benzene from refinery mixtures. Claim 1, the sole independent claim, reads as follows:

> 1. A process for the coproduction of ethylene and purified benzene comprising:
>
> providing a first mixture comprising benzene, toluene, and one or more C_6 to C_7 non-aromatics;
>
> separating the majority of the benzene and the one or more C_6 to C_7 non-aromatics from the majority of the toluene to form a second mixture containing at least a portion of the

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* As indicated *infra*, in March 2014, David Netzer Consulting Engineer LLC changed its name to David Netzer – Petrochemicals Consultant LLC.

> benzene and at least a portion of the one or more C_6 to C_7 non-aromatics, wherein the second mixture is substantially free of hydrocarbons having more than nine carbons;
>
> introducing at least a portion of the second mixture to a cracker and thereafter cracking at least about 80% of the C_6 to C_7 non-aromatics in the portion of the second mixture that has been introduced to the cracker while maintaining essentially no cracking of benzene to produce a cracked product containing ethylene, propylene and *pyrolysis gasoline comprising olefins, di-olefins and benzene*; and
>
> *fractionating the pyrolysis gasoline to form a purified benzene product comprising at least about 80 wt % benzene.*

'496 patent col. 7 ll. 11–32 (emphases added).

The claimed process thus requires four steps: (1) providing a mixture containing benzene, toluene, and C_6–C_7 non-aromatic hydrocarbons; (2) separating most of the benzene and C_6–C_7 non-aromatic hydrocarbons from most of the toluene; (3) introducing the benzene-rich stream into a cracker, *i.e.*, a reactor that breaks down long-chain hydrocarbons to short-chain hydrocarbons, and then cracking the C_6–C_7 non-aromatic hydrocarbons to produce ethylene and pyrolysis gasoline; and (4) "fractionating the pyrolysis gasoline to form a purified benzene product comprising at least about 80 wt % of benzene" ("the fractionating step").

On January 23, 2014, David Netzer, the sole inventor of the '496 patent, assigned the patent to Netzer, a limited liability company newly formed under Texas law. J.A. 85 (assignment); J.A. 81–83 (Certificate of Filing issued by the Secretary of State). The next day, Netzer sued Shell

Oil Company, Shell Chemical LP, and Shell Oil Products Company LLC (collectively, "Shell") in the United States District Court for the Southern District of Texas, alleging that Shell infringed the '496 patent. Shortly thereafter, the State of Texas requested that Netzer remove the word "Engineer" from its name. In March 2014, Netzer changed its name from David Netzer Consulting Engineer LLC to David Netzer – Petrochemicals Consultant LLC through a Certificate of Correction. J.A. 78–79, 87–88. Meanwhile, Shell answered and counterclaimed for a declaratory judgment of noninfringement and invalidity in the district court.

Shell then moved for summary judgment of non-infringement. Shell argued that the term "fractionating" should be construed to mean "conventional distillation, *i.e.*, separating compounds based on difference in their boiling points," which excludes extraction, *i.e.*, separating compounds based on solubility differences. Shell argued that the patentee disclaimed extraction in the specification and prosecution history. According to Shell, its accused process does not meet the fractionating step because it uses extraction—more specifically, the Sulfolane process developed by Shell in the 1960s—to form a benzene product with 99.9% purity. Netzer responded that "fractionating" should be construed to mean "separating a chemical mixture into fractions, no matter the process units used." Examples of process units, according to Netzer, include distillation columns (for separating chemicals based on differences in boiling points), extractors (for separating chemicals based on solubility differences), and hydrotreaters (for hydrogenating unsaturated hydrocarbons, such as olefins). Netzer also argued that Shell infringes literally under either construction, and that Shell also infringes under the doctrine of equivalents.

The district court granted summary judgment of non-infringement. The court did not formally construe the claims, but, rather, implicitly agreed with Shell that

"fractionating" does not include extraction. The court found no literal infringement, reasoning that "Netzer's method does not include extraction and does not yield benzene of 99.9% purity" and that "[t]o infringe, Shell would have to eliminate the extraction step and still produce benzene purified to at least 80%." *Decision* at 2. The court also found no infringement under the doctrine of equivalents because Netzer is barred by "specific exclusion, prosecution-history estoppel, and prior art." *Id.* at 3.

The district court then entered final judgment in favor of Shell. *David Netzer Consulting Eng'r LLC v. Shell Oil Co.*, No. 4:14-cv-00166, ECF No. 46 (S.D. Tex. Aug. 26, 2015). Netzer timely appealed to this court. However, because Shell's counterclaims remained pending in the district court, this court granted the parties' joint motion for a limited remand. On that limited remand, the district court dismissed Shell's declaratory judgment counterclaims without prejudice and then entered an amended final judgment, thus disposing of all claims and counterclaims. *David Netzer Consulting Eng'r LLC v. Shell Oil Co.*, No. 4:14-cv-00166, ECF No. 56 (S.D. Tex. Mar. 31, 2016). Netzer then filed a new notice of appeal, and its appeal was reinstated in this court. We have jurisdiction under 28 U.S.C. § 1295(a)(1).

DISCUSSION

I

Before we reach the merits of Netzer's appeal, Netzer asks us to confirm that it has standing to maintain this action. According to Netzer, on January 24, 2014, at the inception of the lawsuit, an entity known as David Netzer Consulting Engineer LLC held enforceable title to the '496 patent pursuant to the January 23, 2014 assignment, and thus had standing to sue. Netzer argues that the March 2014 name change did not retroactively invalidate the January 2014 assignment under Texas law. The district court did not question Netzer's standing.

We agree with Netzer that it has standing to bring and maintain this action. At the inception of the lawsuit, the '496 patent was assigned to the plaintiff entity, then named David Netzer Consulting Engineer LLC. Although that entity later changed its name to David Netzer – Petrochemicals Consultant LLC as required by Texas law, that name change did not undo the January 23, 2014 transfer of patent ownership. The patent was owned by the same company, under its new name. We therefore conclude that Netzer, as the owner of the '496 patent as of January 24, 2014, has standing to maintain this action.

II

We turn now to the merits of Netzer's appeal. When reviewing a district court's grant of summary judgment, we apply the law of the regional circuit in which the district court sits, here, the law of the Fifth Circuit. *Teva Pharm. Indus. Ltd. v. AstraZeneca Pharm. LP*, 661 F.3d 1378, 1381 (Fed. Cir. 2011). The Fifth Circuit reviews a district court's summary judgment decision *de novo*, applying the same standard used by the district court. *United States v. Caremark, Inc.*, 634 F.3d 808, 814 (5th Cir. 2011). Summary judgment is appropriate when, drawing all justifiable inferences in the nonmovant's favor, "there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(a); *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 247–48 (1986).

To determine infringement, a court first construes the scope and meaning of the asserted patent claims, and then compares the construed claims to the accused product or process. *Absolute Software, Inc. v. Stealth Signal, Inc.*, 659 F.3d 1121, 1129 (Fed. Cir. 2011). "The proper construction of a patent's claims is an issue of Federal Circuit law." *Id.* We review a district court's ultimate claim constructions *de novo* and any underlying factual determinations involving extrinsic evidence for clear

error. *Teva Pharm. U.S.A., Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841–42 (2015).

Here, the district court did not make any factual findings to support any claim construction. *See* Appellant's Br. 21. Its claim construction was implicit in its decision of noninfringement. Because the intrinsic record alone determines the proper construction in this case, we are able to conduct our review adequately and we do so *de novo*. *See Shire Dev., LLC v. Watson Pharm., Inc.*, 787 F.3d 1359, 1364, 1368 (Fed. Cir. 2015) (citing *Teva*, 135 S. Ct. at 840–42).

Infringement is a question of fact. *Absolute Software*, 659 F.3d at 1129–30. "On appeal from a grant of summary judgment of non-infringement, we determine whether, after resolving reasonable factual inferences in favor of the patentee, the district court correctly concluded that no reasonable jury could find infringement." *Id.*

A. Claim Construction

The words of a claim "are generally given their ordinary and customary meaning" as understood by a person of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). Because that meaning is "often not immediately apparent, and because patentees frequently use terms idiosyncratically," the court looks to the intrinsic record, including "the words of the claims themselves, the remainder of the specification, [and] the prosecution history," as well as to extrinsic evidence when appropriate, to construe a disputed claim term. *Id.* at 1314, 1319. "[W]hile extrinsic evidence can shed useful light on the relevant art, we have explained that it is less significant than the intrinsic record in determining the legally operative meaning of claim language." *Id.* at 1317 (quotation marks omitted).

Because a patent is a fully integrated written instrument, we have long emphasized the importance of the specification in claim construction. *Id.* at 1315 (explaining that the specification "is the single best guide to the meaning of a disputed term") (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d. 1576, 1582 (Fed. Cir. 1996)). Thus, if the specification reveals a special definition given to a claim term by the inventor, then the inventor's lexicography governs, even if it differs from the term's ordinary meaning. *Id.* at 1316. Likewise, if the specification reveals an intentional disclaimer or disavowal of claim scope by the inventor, then the inventor's intention as expressed in the specification is regarded as dispositive. *Id.* We have found disavowal or disclaimer based on clear and unmistakable statement, such as "the present invention includes . . . ," "the present invention is . . . ," and "all embodiments of the present invention are . . . ." *Pacing Techs., LLC v. Garmin Int'l, Inc.*, 778 F.3d 1021, 1024 (Fed. Cir. 2015).

Netzer argues that "fractionating" means separating a mixture into fractions, no matter what processes are used to do so. According to Netzer, both the intrinsic record and the extrinsic evidence suggest that fractionation includes any method of separation, not limited to distillation. Netzer contends that the patentee did not disclaim extraction by merely characterizing it as expensive in the specification. Netzer additionally argues that the claim only sets a lower limit on benzene purity, *viz.*, "at least about 80 wt %," and thus does not exclude extraction, which produces highly pure benzene. Netzer lastly argues that "fractionating" ought to be construed to encompass the disclosed preferred embodiment, so as to allow the pyrolysis gasoline to pass through (a) more than one process unit (in the preferred embodiment, a hydrotreater and then two distillation columns), and (b) process units that do not separate chemicals, such as a hydrotreater.

Shell responds that "fractionating" should be construed here to mean separating compounds based on differences in boiling points, not generic "separating" by any means. Shell argues that the intrinsic record compels that construction, which cannot be altered by conflicting extrinsic evidence. In particular, Shell contends that the patent specification uses "fractionating" or "fractionation" to describe separating compounds based on boiling points. According to Shell, the patentee also disclaimed extraction in the specification by distinguishing it from "fractionation" and by explaining that the claimed invention was driven by a shift in market demand that no longer required high purity benzene produced by extraction, such as by the Sulfolane process.

We agree with Shell that the claim term "fractionating" in this patent means separating compounds based on differences in boiling points, *i.e.*, distillation, which excludes extraction, such as in the Sulfolane process. The specification repeatedly and consistently uses "fractionating" or "fractionation" to describe separating petrochemicals based on boiling point differentials. Moreover, importantly, the patentee made clear and unmistakable statements in the intrinsic record, distinguishing the claimed invention from and disclaiming conventional extraction methods that produce 99.9% pure benzene.

Specifically, the '496 patent describes an "azeotrope" problem. An azeotrope is a mixture of two or more compounds that has a uniform boiling point; its components vaporize together as a mixture and thus cannot be easily separated from each other by distillation. J.A. 273. The specification explains that certain C_6–C_7 non-aromatic hydrocarbons form azeotropes with benzene, making it "impossible" to separate benzene from that mixture by "conventional fractionation." '496 patent col. 2 ll. 17–20. The specification then discusses this issue in further detail and refers to the azeotrope problem as "the conventional fractionation issue." *Id.* col. 3 ll. 18–35. Thus, the

patentee used "conventional fractionation" to refer to conventional distillation, *i.e.*, a conventional method that separates compounds based on differences in their boiling points.

Elsewhere, the specification repeatedly and consistently uses the term "fractionation," whether modified by an adjective or not, in connection with temperature or boiling points. *See, e.g.*, *id.* col. 2 ll. 58–59 ("naphtha resulting from crude oil fractionation has a boiling range of 100 to 350º F"); *id.* col. 2 ll. 62–63 ("naphtha undergoes further fractionation to separate a cut point of below 200º F, light naphtha"); *id.* fig.1 & col. 5 ll. 9–14 (describing a "Fractionation & PSA Refrigeration" unit in Figure 1, where ethylene, a more volatile compound, is recovered by "refrigerated fractionation," and propylene and C_4 mix, less volatile compounds, are each recovered by "warm fractionation"); *id.* col. 5 ll. 24–34 (stating that the hydrotreated pyrolysis gasoline undergoes "fractionation" for benzene recovery in two distillation columns). Although the specification uses the word "distillation" only in some instances, *id.* col. 2 ll. 23, 60; *id.* col. 3, ll. 10–11; *id.* col. 8, ll. 12–13, the repeated and consistent references to "fractionation" in the context of boiling-point-based separation indicate that the patentee uses "fractionation" to refer to distillation specifically, not to generic "separation."

Importantly, the patentee distinguished conventional extraction from fractionation in the specification, indicating that "fractionation" does not include conventional extraction. After identifying the azeotrope problem encountered by "conventional fractionation," *id.* col. 2 ll. 17–20, the specification explains that "[t]he *conventional* method of benzene purification and separation from the above azeotropes is by *aromatic extraction or extractive distillation* processes, such as [the] Sulfolane [process]," *id.* col. 2 ll. 21–25 (emphases added), which produces >99.9% pure benzene, *id.* col. 2 l. 28. Thus, according to the patentee, conventional extraction and

conventional fractionation are different methods. Unlike conventional fractionation, conventional extraction—which includes the Sulfolane process—can successfully remove non-aromatic hydrocarbon azeotropes to produce highly pure benzene. The Sulfolane process is therefore conventional extraction, *not* "conventional fractionation." The Sulfolane process was developed by Shell in the 1960s; it is a conventional method of separation. If one were to adopt Netzer's proposed construction that "fractionation" means separation by any method, then "conventional fractionation" would mean separation by any conventional method, which would encompass the Sulfolane process. That interpretation would be contrary to the specification.

Furthermore, as shown by the intrinsic record, the patentee clearly disclaimed conventional extraction, characterizing it as expensive and not required due to a shift in market demand, and distinguishing it from the "present invention." *Id.* col. 2 ll. 25–28, 33–37, 44–48, 51–55. The specification explains that there had been a strong market demand for "benzene of nitration grade, about 99.9 wt %," *id.* col. 1 l. 54, but that such high purity benzene was no longer required in some circumstances; rather, benzene products from the "present invention" containing non-aromatic impurities can be used in its place. *Id.* col. 2 ll. 46–48 ("the assumed non-aromatic impurities in the benzene, resulting from the application of the *present invention*" (emphasis added)); *id.* col. 2 ll. 54–55 ("This market shift is the major driving force behind the *present invention*." (emphasis added)). Likewise, the patentee twice stated during prosecution that the claimed process is "particularly useful" "to produce a benzene product that *need not* have a purity over 99 wt%, *much less* over 99.9 wt%, *as previously required*." J.A. 261, 880 (emphases added).

Those clear statements indicate that the inventor contemplated the claimed invention to be different from

conventional extraction, which produces highly pure, nitration-grade 99.9% benzene. If "fractionation" were to include conventional extraction, then the claimed process would yield 99.9% pure benzene and there would not be significant "non-aromatic impurities . . . resulting from the application of the present invention." '496 patent col. 2 ll. 46–48; *see also id.* col. 3 l. 58, col. 4 ll. 26–30 ("In accordance with the inventive method," "fractionation" produces "close to 98 wt % benzene.").

To be clear, we only conclude that the patentee disclaimed conventional extraction, such as the Sulfolane process. We recognize that the claim language only sets a lower limit on the purity of the benzene product, and thus does not preclude other *un*conventional distillation methods that are capable of producing highly pure benzene. But in view of the disclaimer of conventional extraction in the publicly available intrinsic record, Netzer cannot now attempt to recapture the disclaimed subject matter.

Netzer also argues that construing "fractionating" as distillation would improperly exclude the preferred embodiment disclosed in Figure 1 of the '496 patent. We disagree. In that disclosed embodiment, the pyrolysis gasoline is passed through a hydrotreater, and the resulting "hydrotreated pyrolysis gasoline" is then passed through two distillation columns to produce a benzene product with 98% to 99% purity. *Id.* fig.1 & col. 5 ll. 21–26, 48–51. Contrary to Netzer's argument, the hydrotreater embodiment does not compel a different meaning of "fractionating." The disclosed embodiment merely adds a hydrotreating step—a step that does not separate the individual components of the pyrolysis gasoline from each other, but rather hydrogenates the olefins in that mixture—before the fractionating step; it does not require the construction of "fractionating" to include hydrotreating, or any process other than distillation. Notably, dependent claim 19 is directed to a process "further comprising" a

hydrotreating step, *id.* col. 8 ll. 33–35, thus showing that hydrotreating is not part of the fractionating step.

Rather, the intrinsic record suggests that the patentee referred to the hydrotreated pyrolysis gasoline as a type of pyrolysis gasoline: the language of claim 1 defines "pyrolysis gasoline" as "comprising olefins, di-olefins and benzene," *id.* col. 7 ll. 28–29, and the specification refers to the product from the hydrotreater as the "hydrotreated pyrolysis gasoline," *id.* col. 5 l. 25, which is then *distilled* twice to form benzene with 98% to 99% purity. Accordingly, under the proper construction of "fractionating," the disclosed embodiment is within the scope of the claims.

Netzer primarily relies on two pieces of intrinsic evidence, but neither supports its proposed construction. First, Netzer notes that dependent claim 11 recites "conventional fractionation in a distillation column." *Id.* col. 8 ll. 9–13. Netzer argues that if fractionation means distillation, then there would be no need to state "fractionation in a distillation column." We find that argument unavailing. The quoted phrase merely requires that the fractionation, or distillation, occur in a distillation column as opposed to in another device. Such specific, clarifying language does not change the meaning of fractionation.

Second, Netzer relies on a passage in the specification, which states that: "Fractionation and production of benzene with over 75 wt % purity from reformer reactor effluent by conventional distillation may become difficult . . . ." *Id.* col. 3 ll. 9–11. Netzer again argues that if fractionation means distillation, then it does not make sense to say "fractionation . . . by conventional distillation." We disagree. Netzer has not quoted the full sentence. The omitted portion of the quoted sentence reads: ". . . because of the azeotrope forming characteristics of compounds such as dimethylpentanes, cyclohexane and methyl-cyclopentane." *Id.* col. 3 ll. 11–13. Thus, that full sentence explains that the listed azeotropes make conven-

tional fractionation, *i.e.*, conventional distillation, difficult. To avoid that problem, one may resort to *un*conventional fractionation techniques, such as the claimed process of cracking the C_6–C_7 azeotropes to convert them to shorter chain and more volatile hydrocarbons before fractionation. Thus, the quoted sentence is entirely consistent with, and indeed supports, our construction of "fractionating."

Accordingly, the intrinsic evidence here points in only one direction, and requires that "fractionating" in this patent be construed as separating compounds based on differences in boiling points. The parties cite conflicting extrinsic evidence, which does not compel a different construction. As we have explained, extrinsic evidence may not be used to contradict claim meaning that is unambiguous in light of the intrinsic record. *Summit 6, LLC v. Samsung Elecs. Co.*, 802 F.3d 1283, 1290 (Fed. Cir. 2015).

We therefore conclude that "fractionating" in the present patent means separating compounds based on differences in boiling points, which excludes conventional extraction methods, such as the Sulfolane process.

B. Infringement

Netzer also argues that the district court erred in granting summary judgment of noninfringement. According to Netzer, under its proposed construction, Shell's accused process satisfies the fractionating limitation because Shell separates 99.9% pure benzene from pyrolysis gasoline. Even under Shell's proposed construction, Netzer contends, Shell still literally infringes the '496 patent because it directs its pyrolysis gasoline through a series of process units, some of which are distillation columns, and forms 99.9% pure benzene in the end. It is irrelevant that the mixture also passes through an extractor as part of that process, according to Netzer, because adding an extra step to an otherwise infringing process

does not defeat a finding of infringement. Netzer additionally argues that the district court erred in finding Netzer barred from relying on the doctrine of equivalents to prove infringement, and that the accused process satisfies the function-way-result test as to the "fractionating" limitation.

Shell responds that, under the proper construction of "fractionating," *i.e.*, distillation, or separating compounds based on differences in boiling points, Shell does not infringe the '496 patent because it uses its own Sulfolane process, which uses extraction, not distillation, to form >80% pure benzene. More specifically, Shell explains that its pyrolysis gasoline is refined in multiple steps to yield a mixture containing about 57% benzene, far below the 80% required by the claims; and Shell then uses the Sulfolane process to remove non-aromatic impurities in that mixture to produce 99.9% pure benzene. Shell also responds that Netzer is barred from asserting infringement under the doctrine of equivalents because the patentee disclaimed the Sulfolane process. Even if Netzer is not barred, Shell argues, the Sulfolane process does not purify benzene in substantially the same way as "fractionating."

We agree with Shell that the district court did not err in granting summary judgment of noninfringement. Shell's process does not literally meet the fractionating limitation. Shell relies on conventional extraction—more specifically, its own Sulfolane process—to refine a mixture containing about 57% benzene to a benzene product of greater than 80% purity. As we have explained, "fractionating" means distillation; it does not include conventional extraction. Moreover, the earlier steps of the Shell process only refine pyrolysis gasoline to produce a 57% pure benzene mixture, which does not satisfy the limitation "to form a purified benzene product comprising at least about 80 wt % benzene."

It is true that a method claim with the word "comprising" appearing at the beginning generally allows for additional, unclaimed steps in the accused process, but each claimed step must nevertheless be performed as written. *Dippin' Dots, Inc. v. Mosey*, 476 F.3d 1337, 1343 (Fed. Cir. 2007) ("[The] enumerated steps must . . . all be practiced as recited in the claim for a process to infringe. The presumption raised by the term 'comprising' does not reach into each of the six steps to render every word and phrase therein open-ended . . . ."). Netzer's infringement theory requires rewriting the claimed step to read "fractionating the pyrolysis gasoline [*and*] form[ing] a purified benzene product" rather than "fractionating the pyrolysis gasoline *to* form a purified benzene product," as the claim is written.

We are also unpersuaded by Netzer's argument analogizing the accused process to the preferred embodiment of the '496 patent, as both process the pyrolysis gasoline through multiple steps and generate >80% pure benzene in the end. As we have explained, hydrotreating is not part of the fractionating step. The hydrotreating step in the preferred embodiment merely produces a hydrotreated pyrolysis gasoline; it is not a step that separates the individual components of the pyrolysis gasoline. In the preferred embodiment, the hydrotreated pyrolysis gasoline is distilled twice to form >80% benzene. In contrast, nothing in the Shell process distills pyrolysis gasoline "to form" >80% benzene.

Moreover, as indicated *supra*, the patentee disclaimed conventional extraction, including the Sulfolane process. Netzer cannot now assert that the claimed fractionating step is literally infringed by the Sulfolane process. Likewise, Netzer cannot show infringement under the doctrine of equivalents. The disclaimer of the Sulfolane process for literal infringement applies equally to infringement under the doctrine of equivalents. *SciMed Life Sys., Inc. v.*

Advanced Cardiovascular Sys., Inc., 242 F.3d 1337, 1347 (Fed. Cir. 2001).

We agree with Shell, moreover, that no reasonable jury would find that the accused process performs substantially the same function in substantially the same way to obtain substantially the same result. *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 38–40 (1997). Shell's Sulfolane process does not purify benzene to >80% purity in substantially the same *way* as the claimed process because almost all of the purification in the Sulfolane process is done through extraction, *i.e.*, separating compounds based on solubility differences, which is substantially different from the claimed process of separating compounds based on differences in boiling points. Drawing all justifiable inferences in Netzer's favor, we agree with Shell that Netzer cannot establish infringement under the doctrine of equivalents in light of the substantial difference between the claimed process and the accused process.

We therefore conclude that the district court did not err in granting summary judgment of noninfringement, either literally or under the doctrine of equivalents.

CONCLUSION

We have considered the remaining arguments and find them unpersuasive. For the foregoing reasons, we affirm the district court's summary judgment of noninfringement.

AFFIRMED