

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte OLIVIER DESPONDS,
DOMINIK FABER, REMY GRESSLY,
THOMAS RAPOLD and MARCO PASSAFARO

Appeal No. 2006-2428
Application No. 10/362,500

ON BRIEF

Before GRIMES, GREEN, and LINCK, Administrative Patent Judges.

GRIMES, Administrative Patent Judge.

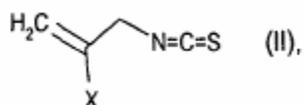
DECISION ON APPEAL

This appeal involves claims to processes of synthesizing thiazole derivatives. The examiner has rejected the claims as anticipated and obvious. We have jurisdiction under 35 U.S.C. § 134. We affirm the rejection of claims 1, 3, 5, and 6; reverse the rejection of claim 4; and enter a new rejection of claim 2.

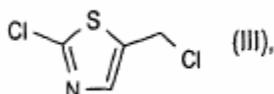
Background

The specification discloses processes of synthesizing thiazole derivatives which are “known as valuable pesticides” Pages 1-2. Specifically (see id.), a method of

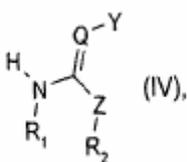
making a thiazole derivative is “described in the literature” in which a chlorinating agent is reacted with a compound of formula (II)



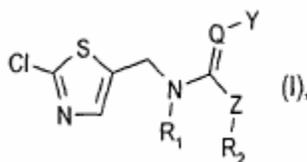
where X is a leaving group, to form the compound of formula (III)



and then reacting the compound of formula (III) with a compound of the formula (IV)



to yield a thiazole derivative of formula (I)



where, in each of the above formulas,

Q is CH or N;

Y is NO₂ or CN;

Z is CHR₃, O, NR₃ or S;

R₁ and R₂ either are each independently of the other hydrogen or C₁-C₈ alkyl

which is unsubstituted or substituted by R_4 or together are an alkylene bridge having two or three carbon atoms which optionally contains a hetero atom selected from the group consisting of NR_5 , O and S,

R_3 is H or C_1 - C_{12} alkyl which is unsubstituted or substituted by R_4 ,

R_4 is unsubstituted or substituted aryl or heteroaryl, and

R_5 is H or C_1 - C_{12} alkyl.

The specification states that SO_2Cl_2 , or sulfuryl chloride, is advantageous as the chlorinating agent because “more material can be prepared in the same unit of time than when Cl_2 is employed, certain waste substances are produced in significantly smaller amounts by that means, and there are further advantages besides.” Pages 2-3. However, “[t]he known preparation processes are . . . not satisfactory in every respect, which is why there is a need to provide improved preparation processes for the compounds of formula (I) and especially of formula (III).” Page 2.

Specifically, the use of SO_2Cl_2 as the chlorinating agent for converting the compound of formula (II) to the compound of formula (III) is said to “ha[ve] the significant disadvantage that stoichiometric amounts of SO_2 are produced, which have to be removed, either by recycling the SO_2 to SO_2Cl_2 using Cl_2 or by having to convert the SO_2 into SO_4^{2-} by oxidation.” Page 3. According to the specification, SO_4^{2-} is an undesirable waste product because it “attacks the concrete walls of waste water purification systems. . . . The conversion of SO_2 to SO_2Cl_2 using Cl_2 , on the other hand, naturally requires a specific production system to be set up.” Id.

The specification discloses methods which maintain the yield advantages of using sulfuryl chloride as the chlorinating agent, while avoiding the waste problems

associated with SO₂ disposal. Id. Specifically, the specification discloses that SO₂ in a “less-than-stoichiometric” amount has a catalytic effect on the chlorinating step wherein compounds of formula (II) are converted to compounds of formula (III). Page 8. Thus, examples P1 and P2 on pages 11-12 of the specification demonstrate that the presence of a relatively small amount of SO₂ markedly increases the yield when a compound of formula (II) is converted to a compound of formula (III) using chlorine gas.

“Catalytic amounts [of SO₂] are to be understood as less-than-stoichiometric amounts based on the starting material of formula (II).” Page 8. The catalytic amount of SO₂ may be added to the reaction medium in gaseous form, or in the form of a compound which releases SO₂, such as SO₂Cl₂. Id. SO₂Cl₂ may also be used as the chlorinating agent. Id. “In a preferred variant of [the] process . . . , some or all of the SO₂Cl₂ required for the catalysis is first metered in and only then is the chlorinating agent, preferably Cl₂, added.” Id.

Discussion

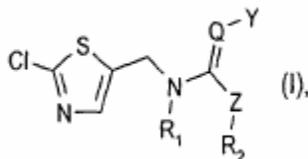
1. Claim construction

Claims 1-6 are on appeal. Appellants argue claims 1 and 5 together and do not separately argue claims 3 and 6.¹ Claims 1, 3, 5, and 6 will therefore stand or fall together. Appellants argue claims 2 and 4 separately; these claims do not stand or fall

¹ The Appeal Brief actually states that “claim 3 is not anticipated . . . because the chlorination reaction step does not proceed . . . in the claimed amount of SO₂ of from 1 mol% to 50 mol%, based on the amount of (II).” Page 5 (emphasis in original); see also page 10 (repeating the argument regarding “claim 3” in response to the obviousness rejection). However, claim 4, not claim 3, recites the limitation requiring “SO₂ . . . in an amount of from 1 mol % to 50 mol %, based on the starting material of formula (II).” Thus, despite the inadvertent error in the Brief, it is clear that Appellants intended to separately argue the patentability of the limitations in claim 4, not claim 3.

with the other claims. See the Appeal Brief, at pages 5, 6, 9 and 10. Claim 1 reads as follows:

1. A process for the preparation of a compound of the formula



and, where appropriate, an E/Z isomer, a mixture of E/Z isomers and/or a tautomer thereof, in each case in free form or in salt form, wherein

Q is CH or N;

Y is NO₂ or CN;

Z is CHR₃, O, NR₃ or S;

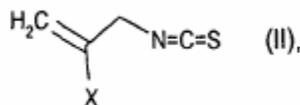
R₁ and R₂ either are each independently of the other hydrogen or C₁-C₈ alkyl which is unsubstituted or substituted by R₄ or together are an alkylene bridge having two or three carbon atoms which optionally contains a hetero atom selected from the group consisting of NR₅, O and S,

R₃ is H or C₁-C₁₂ alkyl which is unsubstituted or substituted by R₄,

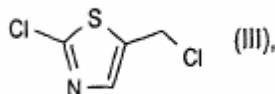
R₄ is unsubstituted or substituted aryl or heteroaryl, and

R₅ is H or C₁-C₁₂ alkyl; wherein

- a) a compound of formula

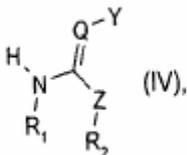


wherein X is a leaving group, is reacted with chlorine to form a compound of formula



or, where appropriate, a tautomer thereof, in each case in free form or in salt form; and

(b) the compound of formula (III) thereby obtained is reacted with a compound of formula



wherein R₁, R₂, Y, Z and Q are as defined hereinbefore for the compound of formula (I);

in which process the chlorination according to process step a) is performed using chlorine in the presence of a catalytic amount of SO₂.

Thus, claim 1 is directed to a process of preparing a thiazole derivative of formula (I). The process comprises two steps. In step a), a compound of formula (II) is reacted with chlorine “in the presence of a catalytic amount of SO₂” to produce a compound of formula (III). In step b), the compound of formula (III) is reacted with a compound of formula (IV) to yield the thiazole derivative of formula (I).

“It is axiomatic that, in proceedings before the PTO, claims in an application are to be given their broadest reasonable interpretation consistent with the specification and that claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art.” In re Sneed, 710 F.2d 1544,1548, 218 USPQ 385, 388 (Fed. Cir. 1983) (citation omitted).

Claim 1 states that the chlorination step takes place “in the presence of a catalytic amount of SO₂.” The specification states that “[c]atalytic amounts [of SO₂] are to be understood as less-than-stoichiometric amounts based on the starting material of formula (II).” Page 8.

Claim 1 does not recite any upper limit for the amount of SO₂ that can be present while the chlorination reaction takes place. Therefore, we interpret the claim to require that the reaction takes place in the presence of at least a less-than-stoichiometric amount of SO₂. This interpretation gives the claim language its broadest reasonable interpretation: a reaction that takes place in the presence of a stoichiometric amount of SO₂ takes place both in the presence of a catalytic amount of SO₂ and in the presence

of SO₂ in excess of a catalytic amount. Therefore, a reaction in the presence of at least a stoichiometric amount of SO₂ meets this limitation of claim 1.

Claim 2 recites “[a] process according to claim 1, wherein the process step a) is carried out in acetonitrile.”

Claim 4 recites “[a] process according to claim 1, wherein in process step a) SO₂ is used in an amount of from 1 mol % to 50 mol %, based on the starting material of formula (II).”

2. Anticipation

The examiner has rejected claims 1-6 under 35 U.S.C. § 102(b) as being anticipated by Uneme.²

The examiner points out that Uneme teaches “a process of making compounds of formula XIII (same as instant formula I) wherein a compound of formula (II) is reacted with a chlorinating agent to produce a compound of formula I (same as instant III), which is reacted with a compound of formula XII (same as instant IV) to form a compound of formula (XIII).” Answer, page 3. The examiner also points out that “[t]he chlorinating agent is chlorine or SO₂Cl₂, which dichlorinates [sic, dissociates?] to SO₂ and Cl₂ under the reaction condition[s].” Id.

Appellants argue that Uneme does not anticipate claim 1 because Uneme does not disclose that the chlorinating step proceeds in the presence of a catalytic amount of SO₂. Appeal Brief, pages 3-5. Specifically, Appellants urge that the portions of Uneme cited by the examiner in the final rejection do not teach chlorinating in the presence of SO₂, but instead relate to Uneme’s second (aminating) step, or to chlorinating with

² Uneme et al., U.S. Patent 5,180,833, issued January 19, 1993.

chlorine in the absence of SO₂. Id. at page 4. Appellants further urge that the examiner has not asserted the inherency of the presence of a catalytic amount of SO₂, but has instead conceded in the first office action that Uneme's chlorination reaction does not proceed in the presence of SO₂. Id.

Thus, argue Appellants, “[b]ased on the foregoing arguments, and the Examiner’s own concession, Appellants assert that the Uneme et al. synthesis does not teach that the chlorination reaction step occurs in the presence of SO₂, nor does it teach that the chlorination reaction step occurs in the presence of a catalytic amount of SO₂.” Id. (emphasis in original).

The examiner responds to Appellants’ arguments by pointing out that Uneme discloses the use of sulfuryl chloride as the chlorinating agent. Answer, page 5. The examiner urges that because sulfuryl chloride dissociates to SO₂ and Cl₂, SO₂ is present in the process described by Uneme. Id. The examiner further urges that the increased yield described in Appellants’ specification as resulting from the use of SO₂Cl₂ instead of chlorine alone is evidence that the SO₂ “must inherently have acted as a catalyst.” Id.

We agree with the examiner that Uneme anticipates claim 1. As noted by Appellants (Brief, page 3), “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” Verdegaal Bros., Inc. v. Union Oil Co., 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). However, discovery of a property inherent to a prior art process does not render that process patentable, even if the prior art did not appreciate the property. Id., 814 F.2d at 633, 2 USPQ2d at 1054. Thus, “[n]ewly discovered results of

known processes directed to the same purpose are not patentable because such results are inherent.” Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc., 246 F.3d 1368, 1376, 58 USPQ2d 1508, 1514 (Fed. Cir. 2001).

In arguing the merits of the anticipation rejection, Appellants direct our attention to columns 3 and 4 of Uneme, which describe the chlorination step. Appeal Brief, page 5. As argued by the examiner (Answer, page 5), Uneme discloses that sulfuryl chloride may be used as the chlorinating agent when converting compound (II) to compound (III) (termed compound (I) by Uneme). Uneme, column 3, lines 13-15 and 43-60.

Moreover, Uneme provides a number of working examples which use sulfuryl chloride as the chlorinating agent. See, e.g., Examples 2 and 4, at column 12.

Under the described reaction conditions, sulfuryl chloride dissociates to yield chlorine gas (Cl_2). Uneme, column 3, lines 13-15. SO_2 is also produced when sulfuryl chloride dissociates under reaction conditions. See Appellants’ specification, page 8 (“ SO_2 may either be added as such in gaseous form, or a compound capable of releasing SO_2 may be added. SO_2Cl_2 is especially suitable for that purpose.”).

Appellants’ subsequent arguments responding to the obviousness rejection essentially concede this point. Brief, page 8 (“[T]he very basic laws of chemistry dictate that SO_2 and Cl_2 will dissociate into their stoichiometric amounts in order to achieve a balanced equation.”). Thus, because sulfuryl chloride necessarily dissociates to produce Cl_2 and SO_2 , SO_2 was inherently present in the reaction medium when Uneme used sulfuryl chloride as the chlorinating agent.

Moreover, in our view, Uneme’s disclosure of using sulfuryl chloride as the chlorinating agent inherently discloses that the SO_2 was present in the reaction medium

in a catalytic amount. Specifically, Uneme states that “[t]he chlorinating agent is used usually in an amount of 1-1.5 equivalents on the basis of the allyl isothiocyanate derivative [II], but an excess amount (2-10 equivalents) may also be used as required.” Column 3, lines 61-64. Therefore, when Uneme uses sulfuryl chloride as the chlorinating agent, the SO₂ dissociating therefrom is present in the reaction medium in at least the same molar amount as compound (II).

As noted supra, Appellants’ specification states that “[c]atalytic amounts [of SO₂] are to be understood as less-than-stoichiometric amounts based on the starting material of formula (II).” Specification, page 8. Depending from claim 1, appealed claim 4 also makes it clear that the term “catalytic amount” encompasses SO₂ amounts ranging from as low as 1 mol % to 50 mol % based the amount of compound (II).

Therefore, the amount of SO₂ capable of catalyzing the chlorination conversion of compound (II) to compound (III) is significantly less than the amount of SO₂ present in the reaction media described by Uneme. Because the SO₂ inherently resulting from Uneme’s use of sulfuryl chloride as chlorinating agent is present in an amount significantly more than the amount required to catalyze the reaction converting compound (II) to compound (III) in the presence of chlorine, the SO₂ in Uneme’s reaction is necessarily present in an amount sufficient to catalyze the reaction. That is, Uneme’s chlorination reaction using sulfuryl chloride as the chlorinating agent necessarily results in more than enough SO₂ being present to catalyze the conversion of compound (II) to compound (III).

Uneme therefore inherently discloses the presence of SO₂ in a catalytic amount, as required by claim 1. We therefore affirm the examiner’s rejection of that claims as

being anticipated under 35 U.S.C. § 102(b). Moreover, because Appellants do not argue dependent claims 3, 5, and 6 separately from independent claim 1, we affirm the anticipation rejection with respect to those claims as well.

As discussed supra, appealed claim 2 requires the chlorinating step to be carried out in acetonitrile. In rejecting claim 2 as anticipated by Uneme, the examiner points out that the “[c]ompound of formula I may be isolated by crystallization (col. 9, lines 19-24) or the second step may be performed without isolating compound I and the reaction may [be] carr[ied] out in acetonitrile. See col. 6, lines 19-34.” Answer, page 3. The examiner further urges that Uneme “teaches that the assay may be performed in a one-pot process and acetonitrile may be used as solvent. Even if applicant adds acetonitrile in step (a) such would have carried over to step (b) if the process is performed continuously (one-pot) as in the instant claim 3.” Id. at pages 5-6.

We agree with Appellants that Uneme does not anticipate claim 2. We note that “a prior art reference may anticipate when the claim limitation or limitations not expressly found in that reference are nonetheless inherent in it.” Atlas Powder Co. v. IRECO Inc., 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1946 (Fed. Cir. 1999). However, the examiner cannot establish inherency merely by demonstrating that the asserted limitation is probable or possible. In re Oelrich, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981) (“The mere fact that a certain thing may result from a given set of circumstances is not sufficient. [Citations omitted.] If, however, the disclosure is sufficient to show that the natural result flowing from the operation as taught would result in the performance of the questioned function, it seems to be well settled that the disclosure should be regarded as sufficient.”) (quoting Hansgirk v. Kemmer, 102 F.2d

212, 214, 40 USPQ 665, 667 (CCPA 1939) (emphasis and bracketed material in original)). Moreover, anticipation is not established by selecting isolated elements from unrelated portions of a reference and combining them to arrive at the claimed invention. See In re Arkley, 455 F.2d 586, 587-588, 172 USPQ 524, 526 (CCPA 1972).

In our view, Uneme does not explicitly or inherently disclose performing the chlorination step in the presence of acetonitrile, as recited in claim 2. Rather, by attempting to construct a single anticipating embodiment from portions of the reference which are not necessarily related, the rejection engages in the type of analysis prohibited by Arkley.

As urged by Appellants (Appeal Brief, page 5), Uneme discloses that the chlorinating step may be performed without a solvent, or in “a solvent that is inert under reaction conditions,” preferably “halogenated hydrocarbons such as dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane, 1,1,1-trichloroethane and 1,1,2,2-tetrachloroethane.” Column 3, lines 55-60. As urged by the examiner (Answer, page 3), Uneme discloses that, after the chlorinating step, the aminating step may be performed without isolation of the intermediate compound, using acetonitrile as the solvent. Column 6, lines 19-34.

However, we see nothing in the reference that necessarily, or inherently, discloses the use of acetonitrile as the solvent in the initial chlorinating step, as required by claim 2. Uneme states that the intermediate compound resulting from the chlorinating step “may be isolated and purified, or in some cases, it can be reacted with an aminating agent without isolation and purification.” Column 6, lines 19-21 (emphases added). Acetonitrile is one of many suitable solvents for the aminating step. Id. at lines 27-47.

Thus, the one-pot method urged by the examiner is a possible methodology for Uneme's process. Similarly, acetonitrile is a possible solvent in the second step of Uneme's synthesis. We do not see any disclosure in Uneme which necessarily links the one-pot method with the use of acetonitrile as the solvent.

Rather, by combining Uneme's embodiment using a one-pot synthesis with the embodiment using acetonitrile in the second synthesis step, the examiner posits a scenario based on a set of disparately disclosed possibilities, rather than any explicit or inherent disclosure in the reference. As noted supra, inherent anticipation may not be based on probability or possibility. Oelrich, 666 F.2d at 581, 212 USPQ at 326. As also discussed supra, to anticipate a claim, a reference must necessarily describe all of the claimed limitations "as set forth in the claim" Verdegaal Bros., 814 F.2d at 631, 2 USPQ2d at 1053. In our view, Uneme simply does not disclose the use of acetonitrile in the chlorination step. We therefore reverse the examiner's anticipation rejection of claim 2.

Claim 4 requires the SO₂ in the process to be "used in an amount of from 1 mol % to 50 mol %, based on the starting material of formula (II)." We agree with Appellants that Uneme does not anticipate claim 4.

Despite including claim 4 in the rejection under § 102(b) over Uneme, the examiner does not appear to state why Uneme anticipates claim 4. The Final Rejection does not address claim 4 directly. In the Examiner's Answer, the sole references to claim 4's concentration limitation appear in the context of obviousness, stating that modification of the amount of SO₂ would have been routine, and "a mere optimization of a variable." Answer, pages 5 and 6. By arguing that one of ordinary skill would have

routinely optimized the concentration of SO₂ to arrive at the claimed amount, the examiner in effect concedes that the claimed concentration is different than the concentration disclosed in the reference. If the claimed concentration of SO₂ is different than the concentration used by Uneme, the reference does not disclose this limitation.

Moreover, in reviewing the reference, we do not see where Uneme describes the process of claim 4. As noted supra, Uneme states that the chlorinating agent can be used in an amount of 1-1.5 equivalents based on the amount of compound (II), and that “an excess amount (2-10 equivalents) may also be used as required.” Column 3, lines 61-64. Thus, when Uneme uses sulfuryl chloride as the chlorinating agent, the SO₂ dissociating therefrom is present in the reaction medium in a molar amount at least equal to the molar amount of compound (II). This amount of is much more than the 1-50 mol % recited in claim 4. We therefore reverse the examiner’s anticipation rejection of claim 4 over Uneme.

To summarize, we agree that Uneme inherently describes the presence of SO₂ in a catalytic amount in the chlorinating step of converting compound (II) to compound (III). However, we do not agree that Uneme describes the use of acetonitrile in the chlorinating step, nor do we agree that Uneme describes the use of SO₂ in an amount of from 1-50 mol %, based on the starting material of formula (II), in the chlorinating step. We therefore affirm the examiner’s anticipation rejection with respect to claim 1 and reverse it with respect to claims 2 and 4. Claims 3, 5 and 6 fall with claim 1.

3. Obviousness

The examiner also rejected claims 1-6 as being obvious over Uneme. Answer, pages 3-5. The examiner argues that because sulfuryl chloride dissociates under

reaction conditions to SO₂ and Cl₂,³ Uneme's chlorination reaction "has SO₂ and inherently, would have acted as a catalyst in the reaction process." Id. at page 5. The examiner further asserts that "[c]laiming variable amounts of SO₂ is a modification within a routine effort of an artisan and does not rise to the level of invention. It is a mere optimization of a variable." Id. (citation omitted).

Appellants argue that the SO₂ in Uneme's process is not present in a "catalytic amount" as required by claim 1. Appeal Brief, pages 7-9. Appellants urge that the claim term "catalytic amount" has been defined in the specification as being a "less-than-stoichiometric amount based on the starting material of formula (II)." Id. at page 8. Thus, urge Appellants, when Uneme uses stoichiometric amounts of sulfuryl chloride as the chlorinating agent, the SO₂ which dissociates from the sulfuryl chloride will necessarily be present in a stoichiometric amount, which is more than the claimed "catalytic amount," as defined in the specification. Id. Because the SO₂ in Uneme's process is present in a stoichiometric amount, argue Appellants, "the amount of SO₂ formed, via dissociation, will not, and can not, be a 'catalytic amount' as required by the claims." Id. at pages 8-9.

We do not agree with Appellants that the specification's definition of the term "catalytic amount" excludes from claim 1 quantities of SO₂ in excess of a catalytic amount. Claim 1 requires only that the chlorinating step be "performed using chlorine in

³ The examiner relies on two apparently equivalent documents, U.S. Patent 4,748,243 and EP 2 260 560, both to Beck et al., to establish the inherent dissociation of sulfuryl chloride to SO₂ and Cl₂. Answer, page 5. The Answer does not list either of these documents as being relied upon in any rejection. See id. at page 3. However, Appellants have essentially conceded this point. Brief, page 8 ("[T]he very basic laws of chemistry dictate that SO₂ and Cl₂ will dissociate into their stoichiometric amounts in order to achieve a balanced equation."). Thus, neither of the Beck documents is required to establish the inherent dissociation of sulfuryl chloride to SO₂ and Cl₂. See also Uneme, at column 3, lines 13-15, disclosing that sulfuryl chloride releases Cl₂ under reaction conditions; and Appellants' specification, at page 8, disclosing that sulfuryl chloride also releases SO₂ under reaction conditions.

the presence of a catalytic amount of SO₂.” Claim 1 does not contain any limitation which excludes the presence of SO₂ in excess of the catalytic amount. Thus, despite the fact that Uneme’s process uses more than a catalytic amount of SO₂, the amount of SO₂ used by Uneme inherently contains within it a catalytic amount.

As discussed supra, in our view, Uneme anticipates claim 1. Therefore, Uneme also renders claim 1 obvious. Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 1548, 220 USPQ 193, 198 (Fed. Cir. 1983) (“[A]nticipation is the epitome of obviousness.”). Because claim 1 does not contain any positive recitation excluding SO₂ amounts in excess of the catalytic amount, Appellants’ response to the obviousness rejection does not persuade us that either of these rejections is incorrect. We therefore affirm the obviousness rejection of claim 1. Claims 3, 5 and 6 fall with claim 1.

In contrast to claim 1, claim 4 contains a positive recitation limiting the amount of SO₂ used in the step of converting compound (II) to compound (III). As discussed supra, claim 4 limits the amount of SO₂ to an amount of from 1-50 mol %, based on the starting material of formula (II).

Uneme discloses that the chlorinating agent should be used in an amount of 1-1.5 equivalents based on the amount of compound (II), and that “an excess amount (2-10 equivalents) may also be used as required.” Column 3, lines 61-64. Thus, when using sulfuryl chloride as the chlorinating agent in Uneme’s process, the smallest amount of SO₂ dissociating therefrom will be at least 100 mol %, using the terminology of claim 4.

In our view, given that the smallest amount of SO₂ suggested by Uneme is 100 mol % based on the starting material of formula (II), one of ordinary skill optimizing the

process of Uneme would not have arrived at the SO₂ amounts of from 1-50 mol %, as recited in claim 4. Moreover, we see nothing in Uneme suggesting the use of less than 100 mol % of SO₂ based on the starting material of formula (II), in the chlorinating step. We therefore cannot agree with the examiner that the amount of SO₂ recited in claim 4 would have been obvious over Uneme's disclosure. We reverse the obviousness rejection of claim 4.

The examiner also rejected claim 2 as obvious in view of Uneme. We vacate this rejection in favor of the new ground of rejection set forth below.

To summarize, because Uneme inherently describes the presence of SO₂ in a catalytic amount in the chlorinating step of converting compound (II) to compound (III), we affirm the examiner's obviousness rejection of claim 1. Claims 3, 5, and 6 fall with claim 1. However, because Uneme does not suggest the use of SO₂ in the chlorinating step in an amount of from 1-50 mol %, based on the starting material of formula (II), we reverse the obviousness rejection of claim 4. We vacate the rejection of claim 2.

New Ground of Rejection

Under the provisions of 37 CFR § 41.50(b), we enter the following new ground of rejection: Claim 2 is rejected under 35 U.S.C. § 103(a) as obvious in view of Uneme and Rührter.⁴

Claim 2 is directed to the same process as claim 1, and adds the limitation that "step a) is carried out in acetonitrile." Uneme discloses that the chlorinating step (step a) in the instant claims) should be carried out in "a solvent that is inert under reaction conditions . . . ," the preferred solvents being "halogenated hydrocarbons such as

⁴ Rührter et al., U.S. Patent 5,571,813, issued Nov. 5, 1996.

dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane, 1,1,1-trichloroethane and 1,1,2,2-tetrachloroethane.” Column 3, lines 55-60. Uneme does not expressly suggest using acetonitrile as the solvent in the chlorinating step.

Rühter teaches that, in the preparation of fused pyrimidine compounds, “a chlorination is preferably carried out . . . with a mineral acid chloride such as sulfuryl chloride . . . in an inert solvent such as acetonitrile, dichloromethane, chloroform, tetrachloromethane or 1,2-dichloroethane.” Column 37, lines 48-54 (emphasis added).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to carry out the chlorinating step of Uneme’s process using acetonitrile as the solvent. The references would have suggested doing so because Uneme teaches that the reaction should be carried out in an inert solvent, and Rühter teaches that acetonitrile (as well as the chlorinated hydrocarbons expressly recited by Uneme) is an inert solvent suitable for use in chlorination reactions using sulfuryl chloride.

Summary

We affirm the rejection of claims 1, 3, 5, and 6 as being anticipated by and obvious over Uneme. We reverse the anticipation and obviousness rejection of claim 4 over Uneme. We reverse the rejection of claim 2 as anticipated, vacate the rejection of claim 2 as obvious, and enter a new rejection of claim 2.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART, REVERSED-IN-PART, VACATED-IN-PART, 37 CFR § 41.50(b)

Eric Grimes)	
Administrative Patent Judge)	
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