

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 30

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HOLGER LÜTJENS,
AXEL INGENDOH,
KARL-RUDOLF GASSEN,
PETER WENZL,
and
KLAUS RALL

Appeal No. 2001-2093
Application No. 09/054,134

ON BRIEF

Before GARRIS, TIMM, and DELMENDO, Administrative Patent Judges.
DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 (2002) from the examiner's final rejection of claims 5 through 8 and 11 through 20, which are all of the claims pending in the above-identified application.

The subject matter on appeal relates to a process for preparing strongly basic anion exchange polymers comprising crosslinked vinylaromatic polymers. According to the appellants (specification, page 2, lines 16-18), "superior strongly basic anion exchangers...are formed if, during the quaternization, certain temperature and pH conditions are employed." Further details of this appealed subject matter are recited in representative claim 5 reproduced below:

5. A process for the preparation of strongly basic anion exchange polymers comprising cross-linked vinylaromatic polymers comprising reacting weakly basic anion exchange polymers bearing aromatic (tertiary amino)methyl groups with ethylene oxide, wherein the weakly basic anion exchange polymers are reacted with ethylene oxide at 70 to 75°C and at a pH of 7 to 11.

The examiner relies on the following prior art references as evidence of unpatentability:

Günter	4,675,180	Jun. 23, 1987
Carte et al. (DE '715) (published German application)	DE 1,054,715	Apr. 9, 1959

In addition, the examiner relies on the following prior art references to rebut the appellants' arguments (examiner's answer of Dec. 27, 2000, paper 25, page 3):

Buske	4,232,125	Nov. 4, 1980
-------	-----------	--------------

Appeal No. 2001-2093
Application No. 09/054,134

Raymond B. Seymour and Charles E. Carraher, Jr., Polymer Chemistry: An Introduction 467 (2nd ed., Marcel Dekker Inc. 1987) (Seymour).

The appellants, on the other hand, rely on the following references as evidence of nonobviousness (appeal brief filed Oct. 20, 2000, paper 24, page 6):

Seymour, supra.

Donald J. Cram and George S. Hammond, Organic Chemistry 429 (2nd ed., McGraw-Hill Book Co. 1964) (Cram).

Robert T. Morrison and Robert N. Boyd, Organic Chemistry 701 (2nd ed., Allyn and Bacon, Inc. 1966) (Morrison).

"Ion Exchange Polymers," in 7 Encyclopedia of Polymer Science and Technology 702 (John Wiley & Sons, Inc., 1967).

Claims 5 through 8 and 11 through 20 on appeal stand rejected under 35 U.S.C. § 103(a) as unpatentable over DE '715 in view of Günter.¹ (Answer, pages 3-7.)

We affirm this rejection.²

As pointed out by the examiner (answer, pages 3-4), the appellants concede that DE '715 describes a process for the preparation of strongly basic anion exchange polymers comprising

¹ In our decision, we cite to the U.S. Patent and Trademark Office English language translation of DE '715 as found in the record.

² The appellants submit that "[c]laims 5-8 and 11-20 are appealed together." (Appeal brief, p. 2.) We understand this statement to mean that the appealed claims stand or fall together. Accordingly, we confine our discussion to claim 5. 37 CFR § 1.192(c)(7) (1997).

reacting weakly basic anion exchange polymers bearing tertiary amino groups with an alkylating agent such as ethylene oxide in the presence of sulfuric acid at temperatures below 150°C to form polymers having quaternary ammonium groups. (Appeal brief, pages 3-4; specification, page 1, line 15 to page 2, line 3.)

In particular, we note that DE '715 discloses a process in which a weakly basic, anion exchange crosslinked polystyrene resin having tertiary amino groups³ (Example 3) is reacted with ethylene oxide in the presence of concentrated sulfuric acid at 30°C. (Example 6.) Thus, as in the invention recited in appealed claim 5, DE '715 teaches the addition of strong sulfuric acid, which, according to the appellants (specification, page 4, line 28 to page 5, line 3), controls the pH.

Although directed to a process for preparing quaternary ammonium salt compounds, as distinguished from quaternary ammonium group containing polymers, Günter teaches that reaction variables such as pH and temperature should be controlled within certain ranges when a molecule containing tertiary amine groups

³ The present specification indicates that the "cross-linked vinylaromatic polymers" include crosslinked polystyrene. (P. 2, l. 26 to p. 3, l. 32.)

is alkylated with ethylene oxide to form the quaternary ammonium. (Column 1, lines 41 to column 2, line 66.)

In contrast to the subject matter of appealed claim 5, the alkylation reaction described in Example 6 of DE '715 is carried out at 30°C instead of "70 to 75°C" as recited in appealed claim 5. In addition, DE '715 is silent on the pH condition for the alkylation reaction described in Example 6.

Nevertheless, DE '715 teaches that the alkylation reaction is carried out at temperatures below 150°C, preferably below 100°C. (Page 5.) Furthermore, Günter would have fairly suggested to one of ordinary skill in the art that pH is a result-effective variable in the quaternization of tertiary amines, regardless of whether the tertiary amines are molecules or macromolecules. Hence, we share the examiner's view that one of ordinary skill in the art would have found it prima facie obvious to modify the process described in Example 6 of DE '715 to include optimum temperatures and pH conditions, thus arriving at a process encompassed by appealed claim 5. In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980) ("[D]iscovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art."); In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) ("[W]here the general conditions of a claim are disclosed in the prior art, it

is not inventive to discover the optimum or workable ranges by routine experimentation."); see also In re Geisler, 116 F.3d 1465, 1469, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997) (explaining that a claimed invention is rendered prima facie obvious when the teachings of a prior art reference discloses a range that touches or overlaps the range recited in the claim).

Once a prima facie case of obviousness is established, the burden of going forward shifts to the applicants. In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); In re Mayne, 104 F.3d 1339, 1343, 41 USPQ2d 1451, 1455 (Fed. Cir. 1997).

The appellants argue that "the only illustrative experiment using ethylene oxide [in DE '715] was carried out at a temperature of 30°C in the presence of concentrated sulfuric acid..." (Appeal brief, page 3.) This argument is not persuasive. One of ordinary skill in the art would have evaluated the prior art disclosure as a whole, rather than solely the working examples or preferred embodiments, because a prior art disclosure is not limited to its working examples or to its preferred embodiments. Merck & Co. Inc. v. Biocraft Labs. Inc., 874 F.2d 804, 807, 10 USPQ2d 1843, 1846 (Fed. Cir. 1989); In re Fracalossi, 681 F.2d 792, 794 n.1, 215 USPQ 569, 570 n.1 (CCPA 1982); In re Lamberti, 545 F.2d 747, 750, 192 USPQ

Appeal No. 2001-2093
Application No. 09/054,134

278, 280 (CCPA 1976); In re Boe, 355 F.2d 961, 965, 148 USPQ
507, 510 (CCPA 1966).

Regarding the use of concentrated sulfuric acid in DE '715 (appeal brief, page 4), the appellants' specification states that strong sulfuric acid may be used to control the pH to the recited range, as we pointed out above. Accordingly, we see no basis for concluding that the use of concentrated sulfuric acid favors a determination of nonobviousness.

The appellants rely on the teachings of Seymour, Cram, Morrison, and The Encyclopedia of Polymer Science and Technology for the proposition that the "reactions of small molecules are not necessarily predictive of reactions of polymers." (Appeal brief, page 6.) We agree with the appellants that the specific reaction conditions suitable for polymers may not necessarily be the same as the conditions for compounds. Nevertheless, the prior art suggests that the same variables would affect the results for alkylation reactions of tertiary amines, regardless of whether polymers or compounds are used as the starting materials. Thus, the prior art as a whole would have fairly suggested to one of ordinary skill in the art that temperature and pH are result-effective variables in the alkylation of polymers containing tertiary amines. Accordingly, it is our judgment that the discovery of workable or even optimum

temperatures and pH conditions appropriate for the process described in DE '715 would have been within the level of the ordinary skill in the art. Boesch, 617 F.2d at 276, 205 USPQ at 219; Aller, 220 F.2d at 456, 105 USPQ at 235; Geisler, 116 F.3d at 1469, 43 USPQ2d at 1365.

The appellants argue that Günter aims to maintain low viscosity homogeneous reaction conditions, while DE '715 relates to insoluble polymeric reactants. (Appeal brief, page 5; reply brief filed Mar. 2, 2001, paper 27, pages 2-3.) This argument is not persuasive. As we discussed above, one of ordinary skill in the art would have known from the prior art that reaction variables, such as temperature or pH conditions, are parameters that must be taken into account in determining the appropriate process conditions for alkylating tertiary amines, regardless of whether the reactant is a compound or a polymer. Buske, which is discussed in detail in the reply brief (page 3), further supports this view. (Column 6, lines 4-25.)

The appellants urge that practicing the claimed process at the recited temperatures and pH conditions overcomes "known difficulties." (Appeal brief, page 4.) We note, however, that the appellants' position is not supported by sufficient evidence. While the appellants rely on the declaration under 37

CFR § 1.132 (1996) of Holger Lütjens,⁴ filed Feb. 23, 2000 (paper 18) as well as Example 1 and comparison Example 2 of the present specification⁵ as objective evidence of nonobviousness (appeal brief, pages 7-8), we concur with the examiner (final Office action, page 4) that the proffered evidence is insufficient to rebut the prima facie case of obviousness.

Specifically, we note that Example 1 and comparison Example 2 are not effective to demonstrate criticality for the claimed pH and temperature ranges because these experiments differ by more than solely the pH values and temperatures. In particular, 477 kg of ethylene oxide are added over 2 hours and then the mixture is stirred for 2 hours in Example 1. By contrast, 550 kg of ethylene oxide are added over 4 hours in comparison Example 2. In re Dunn, 349 F.2d 433, 439, 146 USPQ 479, 483 (CCPA 1965) ("While we do not intend to slight the alleged improvements, we do not feel it an unreasonable burden on appellants to require comparative examples relied on for non-obviousness to be truly comparative. The cause and effect

⁴ This declaration reports the "swelling stabilities of the anion exchange polymers prepared according to Example 1 and comparison Example 2" of the present application.

⁵ Example 1 and comparison Example 2 of the present specification report yield, total capacity, degree of quaternization, and content of low molecular weight polymers.

Appeal No. 2001-2093
Application No. 09/054,134

sought to be proven is lost here in the welter of unfixed variables.”).

Moreover, the proffered evidence is far from being commensurate in scope with the degree of patent protection desired. For instance, Example 1 and comparison Example 2 are limited to the use of N,N-dimethylamino-methyl-polystyrene at a specific amount relative to ethylene oxide. Appealed claim 5, on the other hand, is not so limited. In re Kulling, 897 F.2d 1147, 1149, 14 USPQ2d 1056, 1058 (Fed. Cir. 1990) (“ “[O]bjective evidence of nonobviousness must be commensurate in scope with the claims.”) (quoting In re Lindner, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972)); In re Dill, 604 F.2d 1356, 1361, 202 USPQ 805, 808 (CCPA 1979) (“The evidence presented to rebut a prima facie case of obviousness must be commensurate in scope with the claims to which it pertains.”).

For these reasons and those set forth in the answer, we affirm the examiner’s rejection under 35 U.S.C. § 103(a) of appealed claims 5 through 8 and 11 through 20 as unpatentable over DE ’715 in view of Günter.

The decision of the examiner is affirmed.

Appeal No. 2001-2093
Application No. 09/054,134

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

AFFIRMED

Bradley R. Garris)	
Administrative Patent Judge)	
)	
)	
)	
)	BOARD OF PATENT
Catherine Timm)	
Administrative Patent Judge)	APPEALS AND
)	
)	INTERFERENCES
)	
)	
Romulo H. Delmendo)	
Administrative Patent Judge)	

RHD/kis

Appeal No. 2001-2093
Application No. 09/054,134

BAYER CORPORATION
PATENT DEPARTMENT
100 BAYER ROAD
PITTSBURGH PA 15205-9741