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**Datasheet for the decision
of 15 June 2010**

Case Number: T 1114/06 - 3.3.10

Application Number: 96930874.1

Publication Number: 0854848

IPC: C07C 19/08

Language of the proceedings: EN

Title of invention:

Process for the production of difluoromethane

Patentee:

Honeywell International Inc.

Opponent:

ARKEMA FRANCE

Headword:

Production of difluoromethane/HONEYWELL

Relevant legal provisions:

EPC Art. 56

EPC R. 42(1)(c)

Relevant legal provisions (EPC 1973):

-

Keyword:

"Both requests: inventive step (no) - purported improvement not shown - reformulation of problem - obvious solution"

Decisions cited:

T 0002/81, T 0020/81, T 0197/86, T 0270/90, T 0939/92,
T 0355/97

Catchword:

-



Case Number: T 1114/06 - 3.3.10

DECISION
of the Technical Board of Appeal 3.3.10
of 15 June 2010

Appellant: ARKEMA FRANCE
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 22 May 2006
rejecting the opposition filed against European
patent No. 0854848 pursuant to Article 102(2)
EPC 1973.

Composition of the Board:

Chairman: R. Freimuth
Members: J. Mercey
F. Blumer

Summary of Facts and Submissions

I. The Appellant (Opponent) lodged an appeal on 12 July 2006 against the decision of the Opposition Division dated 22 May 2006 rejecting the opposition against European patent No. 854 848, and on 19 September 2006 filed a written statement setting out the grounds of appeal. Claim 1 of the granted patent read as follows:

"A process for producing difluoromethane comprising the steps of:

- (A) preheating a composition comprising hydrogen fluoride and dichloromethane to a temperature in the range from 125°C to 400°C, to form a vaporized and superheated composition;
- (B) reacting the preheated composition of step (A) in the presence of a fluorination catalyst under conditions suitable to form a product stream comprising difluoromethane, chlorofluoromethane, hydrogen chloride, dichloromethane and hydrogen fluoride;
- (C) recovering by distillation from the product stream of step (B) a high boiling fraction comprising hydrogen fluoride, dichloromethane, and chlorofluoromethane and a low boiling fraction comprising difluoromethane, hydrogen chloride, hydrogen fluoride, and reaction byproducts; and
- (D) recovering substantially pure difluoromethane from the low boiling fraction of step (C)."

II. Notice of Opposition had been filed by the Appellant requesting revocation of the patent as granted in its entirety on the grounds of lack of inventive step (Article 100(a) EPC), lack of sufficiency of disclosure (Article 100(b) EPC), and of extending the subject-

matter of the patent in suit beyond the content of the application as filed (Article 100(c) EPC). *Inter alia* the following documents were submitted in opposition proceedings:

- (1) EP-A-128 510,
- (3) JP-A-6 263 657, English translation,
- (4) EP-A-546 883 and
- (6) Declaration of P. G. Clemmer dated 2 February 2001.

III. The Opposition Division held that the claims of the granted patent fulfilled the requirements of Article 100(c) EPC, the invention was sufficiently disclosed and involved an inventive step, document (1) being considered to represent the closest prior art. In the light of the disclosure of this document, the problem to be solved was regarded as the provision of a method for making difluoromethane with improved cost efficiency and productivity, the examples in the patent in suit and declaration (6) showing that said problem had been credibly solved. The solution, namely to preheat the reactants to between 125 and 400°C to form a superheated composition, was suggested by neither document (1) alone, nor in combination with document (4).

IV. The Appellant argued that the subject-matter of the present invention was not inventive over document (1), said document being also concerned with a catalytic vapour phase process for producing difluoromethane from dichloromethane and hydrogen fluoride. It submitted that said document implicitly disclosed a preheating step, since when feeding the gaseous reactants from the evaporator to a reactor maintained at a temperature of

330°C, some heat transfer from the reactor to the reactants compulsorily took place. It submitted that the problem formulated by the Respondent and reflected in the contested decision, namely of providing a process with *inter alia* improved productivity, had not been shown to have been credibly solved, neither by the examples in the patent in suit, nor by the declaration (6). The comparison of Example 7 of document (1) and Example 2 of the patent in suit was not fair, as it was not possible to ascertain that the same amount of catalyst had been used in each case, such that it was not possible to conclude that any effect achieved by Example 2 of the patent in suit was due to the particular nature of the preheating step (A). The declaration (6) contained no comparative examples and was thus unsuitable for demonstrating any alleged advantages. The claimed solution differed from the process of document (1) by virtue of the fact that the reactants were preheated to a specific temperature to form a superheated composition, and by the recovery steps (C) and (D). However, in document (4), which also related to the vapour phase fluorination of chlorohydrocarbons having *inter alia* one carbon atom, the reactants were preheated to the reaction temperature which was described as 300 to 500°C when complete substitution of the chlorine atoms was desired, a temperature of 350°C being used in all of the examples, said temperatures resulting in a superheated composition under the usual conditions for such a reaction. Furthermore, such a preheating step had been widely used industrially for decades for both exothermic and endothermic reactions, as shown by the document:

(7) Declaration of J.-L. Dubois dated 21 September 2006

filed with the letter dated 4 October 2006. With regard to steps (C) and (D), these were merely standard product recovery steps, distillation being a purification method well known to the skilled person and explicitly taught for the same product mixture by document (3).

During oral proceedings, held on 15 June 2010, the Appellant indicated that it no longer maintained its objections under Articles 100(b) and (c) EPC.

V. The Respondent submitted that the subject-matter was inventive and also started from document (1) as the closest prior art. It conceded that although said document only explicitly disclosed the evaporation of the reactants prior to supplying them to the reactor, for which a temperature of 10°C was sufficient, some preheating of the reactants would nonetheless implicitly occur. However, superheating of the reactants to a temperature of 125 and 400°C was not specifically disclosed therein. In the light of document (1), the problem to be solved by the patent in suit was to provide a process for preparing difluoromethane with improved yield and productivity, the aspect of improved cost efficiency being dropped during the proceedings for the reason of not being a technical problem. The solution comprised preheating the reactants to a temperature between 125 and 400°C to form a superheated composition according to the main request, namely the patent as granted, or to between 175 and 300°C to form a superheated composition,

according to the auxiliary request filed with letter dated 8 December 2009. Declaration (6) showed that the beneficial effect of superheating the reactants was evident on an industrial scale, since it allowed the use of a smaller, less expensive adiabatic reactor. Furthermore, a comparison of Example 7 of document (1) and Example 2 of the patent in suit, which had similar difluoromethane productivity, showed that the contact time used in the former was almost twice as long as that used in the latter, such that the claimed process would be expected to achieve a greater yield of difluoromethane than the process of the closest prior art when using the same contact time. Documents (1) and (3) were completely silent with regard to preheating the reactants to a temperature between 125 and 400°C to form a superheated composition. Document (4) was also irrelevant in this respect, since although it taught a fluorination reaction with hydrogen fluoride wherein the reactants were preheated to 350°C, it did not specifically refer to the fluorination of dichloromethane, document (1) teaching in its prior art section that said compound was particularly difficult to fluorinate. As such, the skilled person, starting from document (1), would not have turned to a document which did not specifically address this problem. Even if the skilled person had turned to document (4), the preheating step was described only in the examples therein, which all related to the fluorination of chlorotrifluoroethane, said reaction being endothermic whereas the claimed reaction was mildly exothermic, such that any teaching therein could not be transferred to the claimed process. Indeed, document (7), filed by the Appellant itself, most particularly the first two paragraphs on page 4 thereof, taught that endothermic

and exothermic reactions should be operated differently *vis-à-vis* the preheating of the reactants. Whilst conceding that under the preheating conditions used in the examples of document (4), a superheated composition was indeed obtained, the Respondent argued that its obtention was merely accidental, it not being specifically taught that a superheated composition was desired. The statement in the declaration (7) that preheating of reactants to a temperature close to the reaction temperature was a widespread practice in industry might be true for certain specific reactions, such as the ammoxidation of methanol, but to say that this was true for industry as a whole, or even fluorination reactions as a whole, was a gross over-generalisation, and was not supported by any published evidence. Indeed, it was not possible to generalise whether it was beneficial to superheat reactants, since this depended on many criteria, such as whether the reaction to be performed was exothermic or endothermic. With regard to the process of the auxiliary request, there was no teaching in document (4) to preheat the reactants to a temperature between 175 and 300°C, but only to 350°C. Thus, the skilled person would not have arrived at the claimed process without exercising inventive ingenuity.

- VI. The Appellant requested that the decision under appeal be set aside and the patent be revoked.

The Respondent requested that the appeal be dismissed, or subsidiarily, that the patent be maintained on the basis of the auxiliary request submitted with the letter dated 8 December 2009.

VII. Oral proceedings were held on 15 June 2010. At the end of the oral proceedings, the decision of the Board was announced.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. *Amendments (Article 100(c) EPC)*

In the appealed decision (cf. point III above), claim 1 of the main request was found not to contain subject-matter extending beyond the application as filed. This ground of opposition was no longer maintained during the appeal proceedings, nor does the Board see any reason to question the allowability of claim 1 under Article 100(c) EPC of its own motion.

3. *Sufficiency of Disclosure (Article 100(b) EPC)*

In the appealed decision (cf. point III above), the invention was found to be sufficiently disclosed. At the oral proceedings before the Board, the Appellant no longer maintained its objection under Article 100(b) EPC, nor does the Board see any reason to take a different view to the Opposition Division. Hence, it is unnecessary to go into more detail in this respect.

4. *Inventive step*

4.1 According to the established jurisprudence of the Boards of Appeal it is necessary, in order to assess inventive step, to establish the closest state of the art, to determine in the light thereof the technical problem which the invention addresses and successfully solves, and to examine the obviousness of the claimed solution to this problem in view of the state of the art. This "problem-solution approach" ensures assessing inventive step on an objective basis and avoids an *ex post facto* analysis.

4.2 The patent in suit is directed to a catalytic vapour phase process for producing difluoromethane from dichloromethane and hydrogen fluoride. A similar process already belongs to the state of the art, namely to the disclosure of document (1).

4.2.1 More particularly, this document discloses a process for producing difluoromethane, which process comprises evaporating hydrogen fluoride and dichloromethane in an evaporator (see page 9, lines 5 to 7) and then reacting them in the gaseous phase in the presence of a catalyst (see claim 1) to form a product stream comprising difluoromethane, chlorofluoromethane, hydrogen chloride, dichloromethane and hydrogen fluoride (see Examples). Both parties agreed that step (B) of claim 1 of the patent in suit was thereby disclosed in document (1), whereas the recovery steps (C) and (D) were not disclosed therein.

4.2.2 In document (1), the vaporised composition comprising hydrogen fluoride and dichloromethane is supplied from the evaporator to the reactor which is heated in Example 6 to a temperature of 330°C. This transfer must occur via some sort of pipe. In view of the high temperature in the reactor, some heat transfer from said reactor to this pipe, and thus to the gaseous composition therein, must take place. As such, preheating of the reactants is a necessary consequence of carrying out the process of document (1). However, in view of the silence of document (1) concerning exactly how the gaseous composition is supplied from the evaporator to the reactor, the amount of heat transfer from the reactor to the gaseous composition can neither be calculated nor ascertained experimentally but would be mere speculation. As a result thereof, the temperature range of 125 to 400°C for the preheated composition comprising hydrogen fluoride and dichloromethane is not directly and unambiguously disclosed in document (1), let alone a superheated state of that composition. This finding was conceded by the Appellant during the oral proceedings.

4.2.3 Thus, the Board considers, in agreement with the Opposition Division and both parties, that the disclosure of document (1) represents the closest state of the art and, hence, takes it as the starting point when assessing inventive step.

4.3 The technical problem underlying the patent in suit, as formulated by the Respondent, comprised the provision of a process for producing difluoromethane from dichloromethane with improved yield and productivity. During the appeal proceedings, the Respondent dropped

improved cost efficiency as forming part of the problem, since economic considerations may not form part of the problem, which should be merely of a technical nature (see Rule 42(1)(c) EPC 2000; Rule 27(1)(c) EPC 1973).

4.4 As the solution to this problem, the patent in suit proposes the process according to claim 1, characterised by the preheating step (A) insofar as the composition comprising hydrogen fluoride and dichloromethane is preheated to a temperature in the range of 125 to 400°C to form a superheated composition, and by the recovery steps (C) and (D). The Respondent conceded that the recovery steps were not, however, critical for achieving the alleged improved yield and productivity.

4.5 The Appellant and the Respondent were divided as to whether or not the evidence presented convincingly showed the successful solution of the problem defined in point 4.3 above *vis-à-vis* the closest prior art. To demonstrate that the process achieves the alleged improvement in yield and productivity, the Respondent, who by alleging this fact carries the burden of proving it (see decisions T 270/90, OJ EPO 1993, 725, point 2.1 of the reasons and T 355/97, point 2.5.1 of the reasons, not published in OJ EPO), relied upon a comparison of Example 2 of the patent in suit and Example 7 of document (1), which allegedly showed that the claimed process resulted in a similar yield of difluoromethane but in approximately half the contact time. The Respondent also relied upon the declaration (6) which allegedly showed that the beneficial effect of superheating the reactants was evident on an industrial scale.

- 4.6 According to established jurisprudence, in the case where comparative tests are chosen to demonstrate an inventive step with an improved effect over a claimed area, the nature of the comparison with the closest state of the art must be such that the effect is convincingly shown to have its origin in the distinguishing feature of the invention. For this purpose it may be necessary to modify the elements of comparison so that they differ only by such a distinguishing feature (see T 197/86, EPO OJ 1989, 371, points 6.1.2 and 6.1.3 of the reasons).
- 4.6.1 In the present case, there is at least one crucial operating condition which has not been shown to be the same in the examples to be compared, namely the amount, size and shape of the catalyst.
- 4.6.2 In Example 7 of document (1), the catalyst amount is given as a volume (100 ml) of pellets having a specific size (4 mmØ x 4 mmH), whereas in Example 2 of the patent in suit, the catalyst amount is given only as a volume (110 ml), no indication of the shape or size of said catalyst being given, only that it was "co-extruded". Thus the amount, shape and size of the catalyst used in Example 2 of the patent in suit is unknown and cannot be determined. Since the amount of catalyst used, as well as its shape and size, are crucial for defining its activity and hence also the yield and productivity of the fluorination process in which it is used, and since it is not known whether the catalysts used in Example 2 of the patent in suit and in Example 7 of document (1) are identical in all respects, these two examples cannot be fairly compared.

4.6.3 Thus in view of the fact that these two compared examples have not been shown to differ exclusively by virtue of the presence or not of preheating the composition comprising heating hydrogen fluoride and dichloromethane to a temperature in the range of 125 to 400°C to form a superheated composition, a causal link between any possible yield/productivity increase and said particular preheating step has not been shown.

4.6.4 In any case, even if these two examples did in fact represent a fair comparison, the conclusions drawn by the Respondent, namely that as a result of the particular preheating step, the process of the invention produced a similar yield of difluoromethane in approximately half the contact time, is not supported by the facts. What has apparently been shown is that the contact time for Example 7 of document (1) was in fact 19 seconds whereas that of Example 2 of the patent in suit was 10 seconds. The contact time is, however, as indicated in the calculations provided by the Respondent in its letter dated 25 March 2010, a function of the volume of catalyst used and the volumetric flow rate of the reaction mixture, this latter value being also dependent on the reaction pressure used. Thus the contact time can be adjusted arbitrarily, and does not necessarily correspond to the actual time needed to achieve a certain result. Thus even if it had been convincingly shown that similar yields were attained in Example 7 of document (1) and Example 2 of the patent in suit, the former yield being attained in 19 seconds and the latter in 10 seconds, wherein the only other difference between the two examples was the nature of the preheating step, this

fact would still not support the Respondent's reverse allegation that "with the same contact time, the claimed invention would be expected to achieve a greater yield of the desired R32 [difluoromethane] than that achieved in Example 7 of D1" (letter dated 25 March 2010, page 2, last paragraph). Indeed, contrary to the Respondent's allegation, it can be seen from Examples 3 to 5 of the patent in suit that regardless of the very different contact times varying from 11 to 40 seconds actually used, the same yield and productivity of difluoromethane is obtained. Thus, it appears plausible that a contact time of 10 seconds in Example 7 of document (1) was in fact sufficient to achieve the level of fluorination of dichloromethane seen to be achieved with a contact time of 19 seconds, with the consequence that no improvement has been convincingly demonstrated.

4.6.5 The Respondent argued that the only reason that the same yields were obtained in Examples 3 to 5 of the patent in suit, despite the different contact times used, was because in each of these examples the particular preheating step according to the invention was employed. However, it has not been shown, neither by substantiating facts nor by corroborating evidence, that the use of different contact times in the process of Example 7 of document (1) would indeed result in different yields. Thus the Respondent's argument is mere speculation.

4.7 With regard to the declaration (6), this document merely reflects the opinion of an individual person, in this case, one of the inventors of the process of the patent in suit. Such a document is not a substitute for

missing evidence necessary to demonstrate that any alleged effect has in fact been achieved, the onus of proof lying with the Respondent who alleged said effect (see point 4.5 above).

- 4.7.1 In any case, the advantages alleged in said document are stated as being evident on an "industrial scale" **only**. However, the production of difluoromethane on an "industrial scale" is not a requirement of claim 1 of the patent in suit, which embraces the production of difluoromethane on any scale. Thus, this document, regardless of its insufficiency in other respects (see point 4.7 above) cannot be suitable for demonstrating any advantages for the claimed process over the whole breadth of the claim. A purported technical effect can form the basis for a finding of inventive step only if it were credible that substantially all the claimed embodiments possessed this improvement (see decision T 939/92, OJ EPO 1996, 309, point 2.5.4 of the reasons).
- 4.8 According to the jurisprudence of the Boards of Appeal, alleged but unsupported advantages cannot be taken into consideration in respect of the determination of the problem underlying the invention (see e.g. decision T 20/81, OJ EPO 1982, 217, point 3, last paragraph of the reasons). Since in the present case the alleged improvement, namely improved yield and productivity, lacks the required experimental support, the technical problem as defined in point 4.3 above needs reformulation.

4.9 Thus, in view of the teaching of document (1), the objective problem underlying the patent in suit is merely the provision of a further process for producing difluoromethane from dichloromethane.

4.10 Finally, it remains to decide whether or not the proposed solution to the objective problem underlying the patent in suit is obvious in view of the state of the art.

4.10.1 When starting from the process for producing difluoromethane from dichloromethane known from document (1), it is a matter of course that the person skilled in the art seeking to provide a further process would turn his attention to that prior art addressing other processes for the fluorination of chlorohydrocarbons, for example, document (4). Said document is concerned with the catalytic fluorination of halogenated hydrocarbons by hydrogen fluoride in the gas phase (see claim 12), more particularly of C₁ to C₃ halogenated hydrocarbons having one or more hydrogen atoms (see page 4, lines 43 to 45). The general teaching for operating all of the fluorination examples described in this document is to preheat the reactants to the reaction temperature (see page 9, line 7). Preheating the reactants to a reaction temperature of 350°C (see page 9, line 6) at the conventional reaction conditions used for this process uncontestedly results in a superheated composition. It is within the ambit of the skilled person, seeking to solve the less ambitious objective problem underlying the patent in suit of providing merely a further process for producing difluoromethane from dichloromethane, to consider routinely any conceivable modification of the closest

prior art process, including the specific preheating step described in document (4). Thus, the person skilled in the art, following the avenue indicated in the state of the art, would incorporate such a preheating step known from document (4) into the process of document (1) without exercising any inventive ingenuity. Therefore, the arbitrary choice of a temperature range embracing a temperature already taught in the state of the art for the fluorination of chlorohydrocarbons cannot provide the claimed process with any inventive ingenuity.

Recovery steps (C) and (D) of claim 1 comprise, undisputedly, merely a conventional distillation process, and are in any case taught by claim 1 of document (3), which describes the distillation of the products of the reaction of dichloromethane with hydrogen fluoride, to give a distillate comprising difluoromethane and hydrogen chloride and bottoms comprising dichloromethane, chlorofluoromethane and hydrogen fluoride, followed by recovery of difluoromethane from the distillate. These conventional steps thus cannot contribute towards inventiveness of the claimed process.

4.11 For the following reasons, the Board is not convinced by the Respondent's submissions in support of the presence of an inventive step.

4.11.1 The Respondent argued that document (1), in the section relating to Background of the Invention (see page 1, line 8 to page 2, line 18), described the difficulty in producing difluoromethane with high efficiency, the poor reactivity of the $-\text{CHCl}_2$ group rendering it

difficult to substitute all chlorine atoms by fluorine atoms, such that the skilled person would not have considered document (4) when seeking to solve the problem underlying the patent in suit, since said document did not specifically address the fluorination of dichloromethane.

However, document (1) itself already overcomes the drawbacks addressed in the prior art section therein (see page 2, line 20 to page 3, line 7), with the consequence that the skilled person, starting from said document would not be discouraged from looking to other documents relating to the fluorination of chlorohydrocarbons. In any case, document (4) specifically addresses the fluorination of compounds having the $-CHCl_2$ end-group (see page 4, lines 47 and 48) thereby giving an additional incentive to transfer process features taught therein, in the present case the specific preheating step, onto the process described in document (1) which fluorinates the very same $-CHCl_2$ end-group. Thus nothing was submitted by the Respondent from which the Board could reasonably conclude that the skilled person would have been deterred from turning to document (4) when faced with the problem of providing a further process for producing difluoromethane.

- 4.11.2 The Respondent argued that even if the skilled person had turned to document (4), said document was primarily concerned with novel catalysts and not with the fluorination reaction conditions.

However, document (4) is also concerned with a process for the fluorination of chlorohydrocarbons (see page 4,

line 43 to page 5, line 23, page 8, line 52 to page 12, line 29 and claim 12), such that the skilled person would take its teaching into account when faced with the problem of providing a further process for producing difluoromethane by fluorination of dichloromethane. The fact that document (4) teaches the use of a particular type of fluorination catalyst is irrelevant, because the presently claimed process is not restricted to the use of any specific catalyst.

- 4.11.3 The Respondent further submitted that there was no general teaching in document (4) to preheat any chlorohydrocarbon reactant mixture to a specific temperature, said document merely teaching that a specific mixture comprising hydrogen fluoride and 1-chloro-2,2,2-trifluoroethane should be preheated in this manner.

However, preheating to the reaction temperature is a general teaching of document (4) (see point 4.10.1 above) in the same type of process, namely a fluorination of chlorohydrocarbons, such that, in the Board's judgement, it was obvious for the skilled person, seeking merely an alternative method of fluorination of the chlorohydrocarbon dichloromethane, to incorporate such a step into the process known from document (1) with a reasonable expectation of success.

- 4.11.4 The Respondent also submitted that document (4) did not specifically teach that a superheated composition of the reactants was desired, the fact that such a composition was produced by the preheating step described therein being merely accidental.

However, when the skilled person follows the teaching of document (4), he automatically obtains a reactant composition which is superheated. A teaching in the prior art is sufficient to render the proposed solution obvious for the skilled person when merely aiming at providing a further preparation process, it not being necessary that said teaching is particularly emphasised in the prior art.

4.11.5 The Respondent argued that although document (4) taught a fluorination reaction with hydrogen fluoride wherein the reactants were superheated, it related to the fluorination of 1-chloro-2,2,2-trifluoroethane and not of dichloromethane, said reaction being endothermic whereas the claimed reaction was mildly exothermic, such that any teaching therein could not be transferred to the claimed process. In support of this argument it referred to the declaration (7) filed by the Appellant, which allegedly showed more generally that the skilled person would not have transferred his knowledge regarding superheating of reactants for endothermic reactions to an exothermic reaction.

Said declaration (7), however, merely reflects the opinion of an individual person and is no substitute for corroborating evidence (see point 4.7 above). In any case, it does not indicate that reactants for exothermic reactions, in contrast to endothermic reactions, should not be pre-heated to form a superheated composition at all, but merely that the preheating should be carried out slightly differently in each case. Thus, the Respondent's argument is not supported by the facts.

4.11.6 Finally, the Respondent argued that the skilled person would not have combined the teachings of three different documents, in this case documents (1), (3) and (4), in order to solve the problem posed.

However, step (A) (taught by document (4)), and steps (C) and (D) (taught by document (3)) distinguishing the present invention from the closest prior art (document (1)) do not interact, and are thus merely an aggregation of steps and not a specific combination of steps with a critical interaction. When the problem to be solved is merely to provide an alternative process, there is no upper limit on the number of documents the teachings of which the skilled person would consider in order to arrive at a multitude of aggregated, separate steps, since he would simply do what he could do in view of the state of the art as a whole.

4.12 For these reasons, the subject-matter of claim 1 is obvious.

5. As a result the Respondent's main request is not allowable for lack of inventive step pursuant to Article 56 EPC.

Auxiliary request

6. *Amendments (Article 123(2) EPC)*

The temperature range from 175°C to 300°C finds a basis on page 2, lines 28 to 29 of the application as filed, where ranges of 150°C to 300°C and 175°C to 275°C are disclosed. Since the presently claimed range now

consists of the combination of the lower limit of the second range and the upper limit of the first range, subject-matter extending beyond the content of the application as filed has not been added (cf. T 2/81, OJ EPO 1982, 394, point 3 of the reasons), such that the requirements of Article 123(2) EPC are satisfied.

7. *Inventive step*

7.1 Claim 1 according to the auxiliary request differs from claim 1 of the main request exclusively in that the temperature to which the composition comprising hydrogen fluoride and dichloromethane is preheated is in the range from 175°C to 300°C.

7.2 The Respondent submitted that document (4) merely taught to preheat the reactants to the reaction temperature of the Examples, which was 350°C, such that preheating a composition comprising hydrogen fluoride and a chlorohydrocarbon to a temperature in the range of 175 to 300°C was not taught therein. It conceded, however, that said particular temperature range was not associated with any effect *vis-à-vis* the temperature range of the main request.

7.2.1 However, document (4) (see page 9, lines 7 to 8) teaches to preheat the hydrogen fluoride and chlorohydrocarbon reactants to the reaction temperature without specifying any numerical range. For a reaction wherein complete substitution of chlorine atoms by fluorine atoms is desired, the reaction temperature is described as being 300 to 500°C (see page 5, lines 1 to 2). Said document thus already encompasses the teaching to preheat the reactants to a temperature of

300°C as covered by claim 1 in suit. Since this particular temperature range of 175°C to 300°C is not associated with any effect *vis-à-vis* the temperature range to which the reactants are preheated in the main request, the considerations and conclusion drawn concerning inventive step in points 4.2 to 4.12 above with respect to the main request still apply to the auxiliary request, i.e. the subject-matter of claim 1 of this request is obvious and does not involve an inventive step.

- 7.3 In these circumstances, the auxiliary request shares the fate of the main request in that it too is not allowable for lack of inventive step pursuant to Article 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

C. Rodríguez Rodríguez

R. Freimuth