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Datasheet for the decision of 29 June 2023

Case Number:	T 0657/19 - 3.3.02
Application Number:	11801467.9
Publication Number:	2588485
IPC:	C07F7/22
Language of the proceedings:	EN

Title of invention:
PROCESS FOR PREPARING MONOALKYLTIN TRIHALIDES AND DIALKYLTIN DIHALIDES

Patent Proprietor:
PMC Organometallix, Inc.

Opponent:
Galata Chemicals, LLC

Relevant legal provisions:
EPC Art. 56
RPBA 2020 Art. 13(2)

Keyword:
Inventive step - (no)
Amendment after summons - exceptional circumstances (no)

Decisions cited:
G 0007/93, T 2125/18

Beschwerdekammern

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Case Number: T 0657/19 - 3.3.02

DECISION
of Technical Board of Appeal 3.3.02
of 29 June 2023

Appellant:
(Patent Proprietor)

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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted on 17 December 2018 concerning maintenance of the European Patent No. 2588485 in amended form.**

Composition of the Board:

Chairman	M. O. Müller
Members:	A. Lenzen
	L. Bühler

Summary of Facts and Submissions

I. This decision concerns the appeals filed by the patent proprietor and the opponent against the opposition division's decision (decision under appeal) according to which European patent No. 2 588 485 (patent) in amended form meets the requirements of the EPC.

Since both parties are both the appellant and the respondent, in the following they will continue to be referred to as the patent proprietor and the opponent for the sake of simplicity.

II. Reference is made in the present decision to the following documents filed before the opposition division:

D1	US 3,248,411
D2	US 2,675,399
D4	J. G. A. Luijten and G. J. M. van der Kerk, "Investigations in the field of organotin chemistry", Tin Research Institute, 1955, pages 18 to 20 and 39 to 41
D13	S. Thoonen et al., Tetrahedron 59, 2003, pages 10261 to 10268
D14	H. Zweifel, R. D. Maier and M. Schiller, "Plastics Additives Handbook", 6th edn., Munich: Carl Hanser Verlag, 2009, pages 444 to 450

III. The decision under appeal is based on the patent as granted (main request) and on auxiliary request 1. These requests were pursued by the patent proprietor on appeal and the wording of claim 1 thereof is set out in the reasons for the decision below.

The decision under appeal can be summarised as follows:

- D13 was admitted, D14 was not.
- Novelty was admitted as a new ground for opposition.
- The subject-matter of claim 1 of the main request was novel over D13. This was because D13 did not disclose that the tetraalkyltin "R_4Sn" in equation (1) was a "*tetraalkyltin mixture*" as stipulated in claim 1.
- The subject-matter of claim 1 of the main request was not based on an inventive step over D13 as the closest prior art.
- The subject-matter of claim 1 of auxiliary request 1 was novel over D13 for at least the same reason that claim 1 of the main request had been found to be novel over D13.
- Claim 1 of auxiliary request 1 required that step (b) be conducted without a catalyst. Since the entirety of D13 related to catalytic reactions, this document was not a suitable choice as the closest prior art. Combining D13 with another document as the closest prior art was ruled out for the same reason.
- The closest prior art was D1 and the subject-matter of claim 1 of auxiliary request 1 involved an inventive step starting from this document.

IV. In its statement of grounds of appeal (see section 2 on pages 11 to 12), the opponent referred to new experimental data. It also filed the following documents:

D15 FR 1 449 872 A
D16 NL 6507716 A
D17 Analysenergebnis (one page)

D18	Data sheet of Stannica LLC entitled "TTOT Tetraoctyltin Commercial Grade"
D19	Safety data sheet of Lanxess regarding Axion® CS 4800
D20	A. Bokranz and H. Plum, "Technische Herstellung und Verwendung von Organozinnverbindungen" in Fortschritte der chemischen Forschung, vol. 16, 1971, pages 365 to 403
D21	S. Thoonen et al., Chem. Commun. 2001, pages 1840 to 1841

V. With its statement of grounds of appeal, the patent proprietor filed the sets of claims of auxiliary requests 1 to 3.

VI. With its reply to the opponent's statement of grounds of appeal, the patent proprietor filed the following documents:

D22	GC analysis (two pages)
D23	US 2,862,944

VII. In preparation for the oral proceedings, which had been arranged at the parties' request, the board issued a communication pursuant to Article 15(1) RPBA 2020.

VIII. With a letter dated 15 June 2023, the patent proprietor filed new experimental data (one page, entitled "ANNEX 1").

IX. The oral proceedings before the board were held on 29 June 2023 by videoconference in the presence of both parties. The board decided that:

- D13 would remain in the proceedings

- D15 to D19, the part of D20 relating to a tetraalkyltin mixture, and the experimental data filed with the opponent's statement of grounds of appeal would not be admitted into the proceedings
- the decision of the opposition division to admit novelty as a new ground for opposition was overturned, and therefore this ground would not form part of the appeal proceedings
- the patent proprietor's submissions relating to

  - the improved purity of the monoalkyltin trihalide
  - a reduced amount of the trialkyltin halide
  - a more economic process due to the use of a sub-stoichiometric amount of alkylation agent

  would not be admitted

At the end of the oral proceedings, the chair announced the order of the present decision.

X. The opponent's arguments on the admittance of the submissions made by the patent proprietor during the oral proceedings before the board and on the allowability of the main request and of auxiliary requests 1 to 3 can be summarised as follows:

- The patent proprietor's submissions relating to the improved purity of the monoalkyltin trihalide, a reduced amount of the trialkyltin halide and a more economic process due to the use of a sub-stoichiometric amount of alkylation agent constituted a change of the technical effect relied on by the patent proprietor.
- The subject-matter of claim 1 of the main request lacked novelty over D13 or at least did not involve an inventive step over this document as the closest

prior art. The only feature of claim 1 that could conceivably constitute a distinguishing feature over D13 was that in step (a) a "*tetraalkyltin mixture comprising tetraalkyltin, trialkyltin halide, and dialkyltin dihalide*" was obtained and reacted in step (b). The data in the patent did not show any technical effect associated with this distinguishing feature. To the extent that the patent demonstrated an increased (cumulative) yield of monoalkyltin trihalide due to the recycling of dialkyltin dihalide, this effect must implicitly also be achieved by the process of D13, since that process also recycled the dialkyltin dihalide. Thus, the objective technical problem could merely be to provide an alternative process. The opposition division had already concluded that such an alternative process was obvious in view of D2 and the common general knowledge in D4. The subject-matter of claim 1 of the main request did not involve an inventive step.

- The subject-matter of claim 1 of auxiliary request 1 was not novel over D13 either. At best, it could be distinguished from D13 in the "*tetraalkyltin mixture*" as stipulated in claim 1. That claim 1 required step (b) to be conducted without a catalyst was not a distinguishing feature in any event. Hence, the reasoning given for claim 1 of the main request also applied to claim 1 of auxiliary request 1. Thus, the subject-matter of the latter did not involve an inventive step either.
- The patent proprietor did not present any arguments at all in the appeal proceedings to show why the additional features of auxiliary requests 2 and 3 distinguished the claims from the prior art. Hence,

claim 1 of these requests at least failed to involve an inventive step.

XI. Summaries of the patent proprietor's arguments on the admittance of the submissions it had made during the oral proceedings before the board and the allowability of the main request and of auxiliary request 1 are set out below in the reasons for the decision.

XII. The parties' final requests at the end of the oral proceedings were as follows:

The opponent requested that the decision under appeal be set aside and that the patent be revoked in its entirety.

The opponent further requested that:

- the opposition division's decision to admit D13 and the related novelty objection be confirmed
- the opposition division's decision not to admit D14 be overturned and that this document be admitted
- D15 to D21 be admitted

The patent proprietor requested that the decision under appeal be set aside and that the patent be maintained as granted (main request), or, in the alternative, that the patent be maintained based on one of the sets of claims of auxiliary requests 1 to 3 as filed with the statement of grounds of appeal, implying for auxiliary request 1 that the opponent's appeal be dismissed.

The patent proprietor further requested that:

- the opposition division's decision to admit D13 be overturned and that D13 be held inadmissible

- the opposition division's decision not to admit D14 be confirmed
- the opposition division's decision to admit novelty as a new ground for opposition be overturned and that this ground be held inadmissible
- D15 to D21 and the new experimental data contained in the opponent's statement of grounds of appeal not be admitted
- D22 and D23 and the experimental data filed by letter dated 15 June 2023 be admitted if D15 to D21 and the experimental data contained in the opponent's statement of grounds of appeal are admitted

Reasons for the Decision

The following abbreviations are used below:

AA	alkylation agent
Bu	butyl
Oct	octyl
R	alkyl
X	halide

Admittance of D13

1. The opponent filed D13 after the expiry of the opposition period and raised a novelty objection to granted claim 1 on the basis of this document. It also pointed out that D13 could serve as the closest prior art if the subject-matter of claim 1 is considered novel.

2. The opposition division admitted D13 because it considered this document to be *prima facie* relevant for the assessment of patentability (see the decision under

appeal, page 8, paragraph 2). In particular, the opposition division considered D13 to represent the closest prior art for the subject-matter of granted claim 1 (see point III. above).

3. On appeal, the patent proprietor requested that the opposition division's decision to admit D13 be overturned and that D13 be held inadmissible. The opponent requested that the opposition division's decision be confirmed.

4. The admittance of D13 by the opposition division was a discretionary decision. According to G 7/93 (point 2.6 of the Reasons), a board should only overrule the way in which a first-instance department exercised its discretion if it comes to the conclusion either that the first-instance department did not exercise its discretion in accordance with the right principles, or that it exercised its discretion in an unreasonable way, and thus exceeded the proper limits of its discretion.

4.1 In its decision, the opposition division considered the *prima facie* relevance of D13. This is considered a right principle within the meaning of G 7/93.

4.2 According to the patent proprietor, D13 was not more relevant than any of the documents cited in the notice of opposition. In particular, D13 was not *prima facie* relevant to the inventive step of granted claim 1. D13 concerned the production of (allyl)SnX_3. This technical field/problem differed from that of the patent, which related to the production of $RSnX_3$.

However, this argument does not suggest that the opposition division exercised its discretion in an unreasonable way. In the absence of such an argument, the opposition division's alleged substantive error in its discretionary decision is by no means tantamount to an unreasonable exercise of discretion. Notwithstanding the above, the board fully agrees with the opposition division's assessment of D13 as regards its *prima facie* relevance (see below), and therefore the admittance decision is not to be set aside for this reason alone.

5. In its communication pursuant to Article 15(1) RPBA 2020, the board had already set out the conclusions above. At the oral proceedings before the board, the patent proprietor refrained from making further submissions on these points. Therefore, at the oral proceedings the board saw no reason to deviate from its written preliminary opinion and decided that D13 would stay in the proceedings.

Main request (patent as granted) - inventive step (Article 56 EPC)

6. Claim 1 reads as follows:

> "*A process for producing monoalkyltin trihalide comprising:*
>
> *(a) contacting dialkyltin dihalide with an alkylation agent and, optionally, tin tetrahalide, to form a tetraalkyltin mixture comprising tetraalkyltin, trialkyltin halide, and dialkyltin dihalide;*
> *(b) reacting the tetraalkyltin mixture with tin tetrahalide to form a monoalkyltin trihalide mixture comprising monoalkyltin trihalide, dialkyltin dihalide and optionally trialkyltin halide;*

> *(c) processing the monoalkyltin trihalide mixture to separately recover the monoalkyltin trihalide and a dialkyltin dihalide stream comprising the dialkyltin dihalide and optionally trialkyltin halide; and*
>
> *(d) recycling at least a portion of the dialkyltin dihalide stream recovered in step (c) to the contacting step (a),*
>
> *wherein the dialkyltin dihalide is re-alkylated in step (a) either alone or with the optional tin tetrahalide; and wherein the alkyl is a linear alkyl, a branched alkyl, or a cycloalkyl.*"

In the following, steps (a), (b), (c) and (d) are referred to as alkylation, redistribution, separation and recycling steps, respectively. Thus, claim 1 relates to a process for producing $RSnX_3$, comprising the following steps (the reactions are only shown schematically, i.e. the stoichiometry on both sides of the reaction arrow is not balanced; educts/products which are only optional according to claim 1 have been omitted):

(a) an alkylation step:
$R_2SnX_2 + AA \rightarrow R_4Sn + R_3SnX + R_2SnX_2$

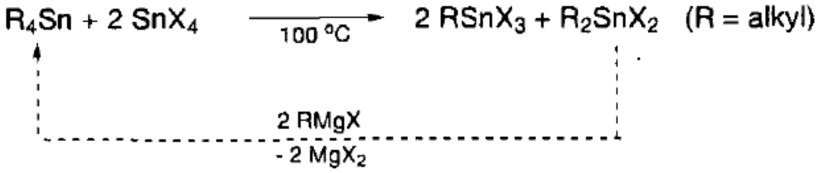
(b) a redistribution step:
$R_4Sn + R_3SnX + R_2SnX_2 + SnX_4 \rightarrow RSnX_3 + R_2SnX_2$

(c) a separation of $RSnX_3$ from the $RSnX_3/R_2SnX_2$ mixture resulting from step (b)

(d) recycling (some of) the R_2SnX_2 remaining from step (c) by feeding it back into step (a)

7. Closest prior art

D13 is a scientific paper which relates to the reaction of allylic halides with tin(II) halides to produce (allyl)SnX_3 using platinum and palladium complexes. Although these studies form the core of D13, as argued by the patent proprietor, the disclosure of D13 is not limited thereto. Rather, the introductory part of D13 describes routes already taken to prepare structurally similar compounds, such as $RSnX_3$, in particular (see page 10261, left column):

> "*Monoalkyltin trihalides,* $RSnX_3$*, (X=Cl, Br, I; R=alkyl) find application as precursors for PVC stabilizers,*[1] *as catalysts for polyurethane production and as precursors for the deposition of* SnO_2*-coatings on glass.*[2] *They are produced industrially by a redistribution reaction, which is controlled by the stoichiometry of the reactants and which usually involves X=Cl (Eq. (1)).*[3] *For economic reasons, the* R_2SnX_2 *is converted in a subsequent step into the* R_4Sn *starting material. Full conversion of* R_4Sn *into 4 equiv. of* $RSnCl_3$ *is only successful for allyl,*[4] *vinyl*[5] *and phenyltins*[6] *or requires a catalyst in the case of alkyltins.*[7]
>
> 
>
>
> (1)
>
> "

In its communication pursuant to Article 15(1) RPBA 2020 (point 31.1), the board agreed with the view of the opponent and the opposition division that this part of the disclosure of D13, which relates to the synthesis of $RSnX_3$ but does not form part of the actual core of D13, can indeed be considered the closest prior art in the present case. This view was not challenged by the patent proprietor in the further course of the appeal proceedings.

8. Distinguishing feature

In its communication pursuant to Article 15(1) RPBA 2020 (point 27), the board had also explained that, and why, the subject-matter of claim 1 differed from the disclosure of D13 as quoted above, in particular equation (1), at most in that in alkylation step (a) a

> "*tetraalkyltin mixture comprising tetraalkyltin, trialkyltin halide, and dialkyltin dihalide*"

was obtained and reacted in the redistribution step (b).

At the oral proceedings before the board, the patent proprietor did not dispute this but instead focused all of its arguments on the above-mentioned distinguishing feature. In favour of the patent proprietor, it is assumed in the following that the feature set out above is in fact a distinguishing feature.

9. Technical effects

9.1 Before the summons to oral proceedings was issued, the patent proprietor's constant position was that compared with the process of D13, the process according to claim 1 increased the efficiency of tin use when preparing $RSnX_3$. In its last written submission before the oral proceedings, which was filed after the summons, and in fact at the oral proceedings themselves, the patent proprietor relied for the first time in the appeal proceedings on the following three technical effects in support of an inventive step:

- the improved purity of the $RSnX_3$
- a reduced amount of the R_3SnX
- a more economic process due to the use of a sub-stoichiometric amount of alkylation agent

As pointed out by the opponent, invoking these three effects constituted a change of the technical effect relied on by the patent proprietor. This was not disputed by the patent proprietor. Moreover, when questioned by the board, the patent proprietor was unable to cite passages from its earlier written submissions, prior to the summons, in which these effects were mentioned or alluded to. The patent proprietor's reliance on these effects thus constitutes an amendment to its appeal case.

Since this amendment was made after the summons, Article 13(2) RPBA 2020 applies, which stipulates that such an amendment shall, in principle, not be taken into account unless there are exceptional circumstances which have been justified with cogent reasons by the party concerned.

At the oral proceedings, the patent proprietor's representative stated that he had only recently taken over the case. However, a change of representative cannot be considered an exceptional circumstance justifying very late amendments to a party's appeal case (see T 2125/18, point 2.3 of the Reasons). Therefore, at the oral proceedings the board decided not to admit the patent proprietor's submissions based on the three effects mentioned above.

9.2 As set out above, before the summons to oral proceedings was issued, the patent proprietor's constant position was that compared with the process of D13, the process according to claim 1 increased the efficiency of tin use when preparing $RSnX_3$. At the oral proceedings before the board, the patent proprietor clarified this to mean that compared with the process of D13, the process of claim 1 resulted in a higher yield of $RSnX_3$. Whether this effect has actually been demonstrated and can therefore be taken into account in the formulation of the objective technical problem is assessed in the following.

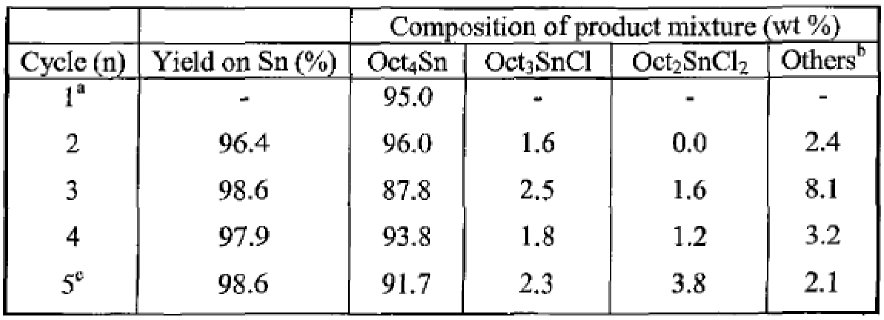
9.3 With regard to the effect of a higher yield of $RSnX_3$, the patent proprietor in its written submissions referred in a sweeping manner to tables 5 and 6 of the patent (see the statement of grounds of appeal, page 6, paragraph 4). However, it did so without explaining how this effect could be derived from these tables and, in particular, without establishing a link between this effect and an alleged distinguishing feature.

The data shown in tables 5 and 6 concern the increase in the (cumulative) yield of $RSnX_3$ over several cycles attributable to the recycling of R_2SnX_2. Since the process in D13 also involves the recycling of R_2SnX_2 (see the dashed arrow in equation (1) in the passage quoted from D13 above), this effect must also be implicitly achieved by the process of D13. However, a technical effect attributable to the present distinguishing feature cannot be deduced from tables 5 and 6.

9.4 Indeed, with regard to the effect of a higher yield of $RSnX_3$, the patent proprietor no longer relied on tables 5 and 6 at the oral proceedings before the board. Instead, the patent proprietor referred to example 3, and more specifically to tables 2 to 4, of the application as filed.

9.4.1 Example 3 describes the synthesis of $OctSnCl_3$ according to the process of claim 1. In a first cycle, a commercially available sample of Oct_4Sn is reacted with $SnCl_4$. The desired product, $OctSnCl_3$, is isolated by distillation. The Oct_2SnCl_2-rich distillation residue is reacted with OctMgCl to give a mixture comprising Oct_4Sn, Oct_3SnCl and, if applicable, Oct_2SnCl_2 ("Oct_4Sn-mixture"). Using this Oct_4Sn-mixture, the process is then repeated for a total of four cycles. The series of cycles is completed with a partial fifth cycle to convert the Oct_2SnCl_2-rich distillation residue of the fourth cycle back to an Oct_4Sn-mixture. Table 2 gives the composition of the Oct_4Sn-mixture used as the starting material in each cycle (as noted above, in the first cycle, a commercial grade of Oct_4Sn was used; unlike tables 3 and 4 (see below), table 2 shows five cycles due to the partial fifth cycle).

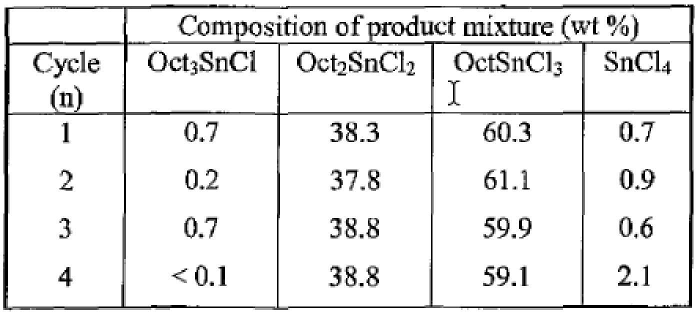
Table 2:



		Composition of product mixture (wt %)			
Cycle (n)	Yield on Sn (%)	Oct_4Sn	Oct_3SnCl	Oct_2SnCl_2	Others[b]
1[a]	-	95.0	-	-	-
2	96.4	96.0	1.6	0.0	2.4
3	98.6	87.8	2.5	1.6	8.1
4	97.9	93.8	1.8	1.2	3.2
5[c]	98.6	91.7	2.3	3.8	2.1

Table 3 summarises the results of the redistribution reaction using the Oct_4Sn-mixtures from table 2 and $SnCl_4$.

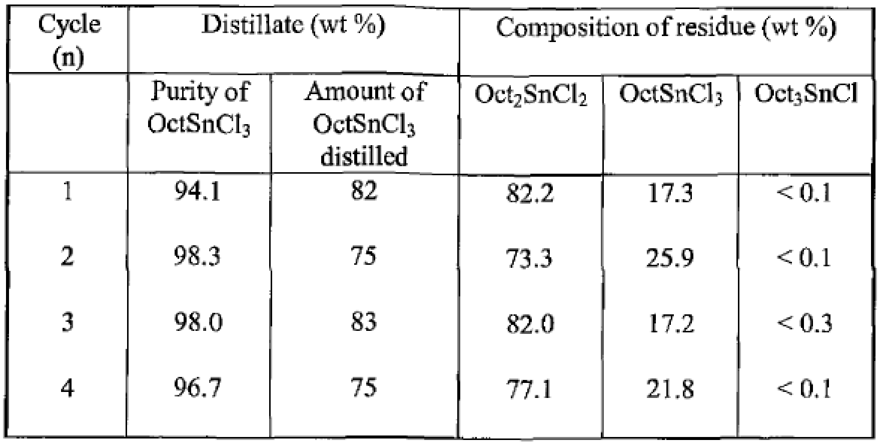
Table 3:



	Composition of product mixture (wt %)			
Cycle (n)	Oct_3SnCl	Oct_2SnCl_2	$OctSnCl_3$	$SnCl_4$
1	0.7	38.3	60.3	0.7
2	0.2	37.8	61.1	0.9
3	0.7	38.8	59.9	0.6
4	< 0.1	38.8	59.1	2.1

Lastly, table 4 summarises the results of the distillation of $OctSnCl_3$ from the $OctSnCl_3/Oct_2SnCl_2$ mixtures from table 3.

Table 4:



Cycle (n)	Distillate (wt %)		Composition of residue (wt %)		
	Purity of $OctSnCl_3$	Amount of $OctSnCl_3$ distilled	Oct_2SnCl_2	$OctSnCl_3$	Oct_3SnCl
1	94.1	82	82.2	17.3	< 0.1
2	98.3	75	73.3	25.9	< 0.1
3	98.0	83	82.0	17.2	< 0.3
4	96.7	75	77.1	21.8	< 0.1

9.4.2 The patent proprietor essentially argued as follows:

The Oct_4Sn-mixture of the second cycle contained Oct_4Sn and Oct_3SnCl but not Oct_2SnCl_2; by contrast, that of the third cycle contained all three tin species, i.e. Oct_4Sn, Oct_3SnCl and Oct_2SnCl_2 (see the composition of the product mixture for cycles 2 and 3 in table 2 above). Therefore, only the Oct_4Sn-mixture of the third cycle was a "*tetraalkyltin mixture comprising tetraalkyltin, trialkyltin halide and dialkyltin dihalide*" as stipulated in claim 1. As could be seen from table 2, the alkylation reaction at the beginning of the third cycle gave a higher yield on tin than in the second cycle (98.6% vs. 96.4%). Furthermore, table 4 showed that the Oct_4Sn-mixture of cycle 3 gave a higher yield of $OctSnCl_3$ after distillation than the Oct_4Sn-mixture of cycle 2 (83% vs. 75%). These results showed the advantages of the process of claim 1 over that of D13 and, in particular, that the distinguishing feature of claim 1 over D13 was linked to a higher yield of $OctSnCl_3/RSnX_3$.

9.4.3 The board does not find the patent proprietor's arguments convincing for the following reasons:

- The yields on tin given in table 2 for the second and third cycles (96.4% vs. 98.6%, respectively) correspond to the yield on tin after the alkylation step, i.e. the step that brings about the distinguishing feature. These yields can only be due to the alkylation reaction itself or to the components used for this. However, any change in the yield on tin derivable from table 2 is not an effect attributable to the present distinguishing feature, since such an effect, if any, could only become apparent in the further subsequent steps of the process. The patent proprietor's reference to the yields given in table 2 is therefore not relevant in the present case.
- Table 4 does show a higher yield of $OctSnCl_3$ after distillation for the third cycle (83%) as compared to the second cycle (75%), i.e. a higher yield of $OctSnCl_3$ for a cycle starting from an Oct_4Sn-mixture according to claim 1 (third cycle) compared to a cycle starting from a mixture which is not in accordance with claim 1 (second cycle). At the same time, however, as set out by the board at the oral proceedings, the yield of $OctSnCl_3$ reported for the

fourth cycle - and this cycle also starts from an Oct_4Sn-mixture according to claim 1 (see the composition of the product mixture for cycle 4 in table 2 above) - is as low as the yield reported for the second cycle (75% in both cases). Therefore, when comparing the fourth cycle with the second cycle, no improvement in the yield of $OctSnCl_3$ can be seen. Against this background, the board is not convinced that the present distinguishing feature results in a higher yield of $OctSnCl_3/RSnX_3$.

In this context, the patent proprietor argued that the "*tetraalkyltin mixture comprising tetraalkyltin, trialkyltin halide, and dialkyltin dihalide*" according to claim 1 was the result of using a sub-stoichiometric amount of alkylation agent. Since the application as filed did not give details for the alkylation agent used to prepare the Oct_4Sn-mixture used for the fourth cycle, the data given for this cycle in table 4 could not refute the patent proprietor's conclusion based on a comparison of the second and third cycles. This reasoning cannot be accepted. First and foremost, the lack of details in experimental data cannot be to the advantage of a patent proprietor if these details are relevant for the recognition of an inventive step. Notwithstanding this, the use of sub-stoichiometric amounts of the alkylation agent is not a feature of claim 1, but the composition of the R_4Sn mixture in relation to the tin species that must be present is. Moreover, with respect to the presence of these tin species, the Oct_4Sn-mixture used for the fourth cycle meets the requirements of claim 1. These arguments cannot therefore change the conclusion drawn above.

10. Objective technical problem

It follows that the effect linked to the distinguishing feature, which the patent proprietor invoked in support of an inventive step, cannot be accepted. Consequently, the objective technical problem must be formulated as being to provide an alternative process for producing $RSnX_3$.

11. Obviousness

From their common general knowledge (see D4, page 41, first paragraph), the skilled person understands that a redistribution reaction forming $BuSnCl_3$ and Bu_2SnCl_2 can be carried out not only between $SnCl_4$ and Bu_4Sn, but also between $SnCl_4$ and a mixture of Bu_4Sn and Bu_3SnCl. D2 (example 2) further discloses that the reaction of Bu_2SnCl_2 with an alkylation agent under selected conditions results in a mixture containing small amounts of Bu_2SnCl_2 in addition to Bu_4Sn and Bu_3SnCl. The board is not aware of any reason, and the patent proprietor did not present any reasons of its own in this respect, as to why the skilled person would have regarded the Bu_4Sn/Bu_3SnCl mixture obtained according to D2, with only a very small content of Bu_2SnCl_2, as being unsuitable for being reacted with $SnCl_4$ in a redistribution reaction as suggested in D4. Small amounts of Bu_2SnCl_2 in the mixture used in the redistribution reaction also seem unproblematic, if only because the redistribution reaction between Bu_4Sn, Bu_3SnCl and $SnCl_4$ produces Bu_2SnCl_2 anyway. The fact that the mixture of D2 contains less Bu_4Sn than Bu_3SnCl is not relevant in the present case, contrary to the patent proprietor's argument based thereon, since claim 1 is not limited in any way with regard to the ratio of R_4Sn and R_3SnCl.

Thus, at least for the process according to D13, in which the alkyl group is butyl and the halide is chlorine, an obvious alternative process is suggested to the skilled person, in which Bu_2SnCl_2 is first subjected to an alkylation reaction according to D2 to obtain a mixture of Bu_4Sn, Bu_3SnCl and Bu_2SnCl_2, and in which this mixture is then subjected to redistribution with $SnCl_4$ to obtain $BuSnCl_3$ and Bu_2SnCl_2. This obvious alternative to the process of D13 falls within the scope of the subject-matter of claim 1, which is not limited with respect to its alkyl groups and halide atoms. Thus, the subject-matter of claim 1 of the main request is not based on an inventive step and the main request is not allowable.

Auxiliary request 1 - inventive step (Article 56 EPC)

12. Claim 1 of auxiliary request 1 differs from claim 1 of the main request only in that step (b) reads as follows (emphasis added):

> "*(b) reacting the tetraalkyltin mixture with tin tetrahalide,* ***wherein no catalyst is included,*** *to form a monoalkyltin trihalide mixture comprising monoalkyltin trihalide, dialkyltin dihalide and optionally trialkyltin halide*"

Thus, the process of claim 1 of auxiliary request 1 further requires that the redistribution step be conducted without a catalyst.

13. There was disagreement between the parties as to whether the use of a catalyst in the redistribution step in equation (1) of D13 was envisaged in the introductory part of this document quoted above. According to the patent proprietor, particularly the last sentence of the above quote from D13 ("***Full conversion of R_4Sn into 4 equiv. of $RSnCl_3$*** *is only successful for allyl,[4] vinyl[5] and phenyltins[6] or* ***requires a catalyst in the case of alkyltins.***[7]", emphasis added) clearly indicated that a catalyst was used in equation (1).

14. In its communication pursuant to Article 15(1) RPBA 2020, the board came to the conclusion by analysing only the content of D13 that the use of a catalyst was not envisaged in the redistribution step in equation (1). This was because, from a logical point of view, the sentence highlighted by the patent proprietor could not refer to equation (1) since the stoichiometry of this equation did not allow a full conversion of R_4Sn to $RSnX_3$. Furthermore, the interpretation of the reaction equation as written, namely without a catalyst, was entirely consistent with the rest of D13, in which a catalyst is very much mentioned in the case of a different reaction equation. Based on its analysis, the board concluded that the additional feature in claim 1 of auxiliary request 1 was not an additional distinguishing feature. This was not contested by the patent proprietor in the further course of the appeal proceedings. At the oral proceedings, therefore, the board saw no reason to deviate from its written preliminary opinion.

15. In view of the above, the board cannot follow the conclusion of the opposition division in the decision under appeal that the entirety of D13 concerned only

catalysed reactions and was therefore not suitable as the closest prior art for the subject-matter of claim 1 of auxiliary request 1. Rather, as with the main request, there is no apparent reason as to why D13 does not also constitute the closest prior art for the subject-matter of claim 1 of auxiliary request 1. The analysis of the inventive step of auxiliary request 1 is thus completely analogous to that of the main request and therefore auxiliary request 1 is not allowable.

Auxiliary requests 2 and 3

16. As pointed out by the opponent and then again by the board in its communication pursuant to Article 15(1) RPBA 2020, the patent proprietor did not provide any arguments as to why the amendments made in claim 1 of auxiliary requests 2 and 3 provide a further distinction from the cited prior art. At the oral proceedings before the board, the patent proprietor refrained from providing any reasoning in this respect.

The board does not see any reason why these amendments provide a further distinction from D13 either. The board has therefore concluded that the amendments made in claim 1 of auxiliary requests 2 and 3 do not further distinguish the subject-matter thereof from D13. Thus, claim 1 of auxiliary requests 2 and 3 does not involve an inventive step for the same reasons as those set out above for claim 1 of the main request and of auxiliary request 1.

Further points

17. There were opposing requests from both parties with regard to the (non-)admittance of D14. As it was

concluded that this document was not relevant to the present decision, there was no need to decide on these requests at the oral proceedings before the board.

18. Before the opposition division, the opponent submitted its very first novelty objection based on D13, arguing that this document disclosed a "*tetraalkyltin mixture*" as stipulated in granted claim 1. This was after the expiry of the opposition period. The opposition division decided not only to admit D13 but also to introduce novelty as a new ground for opposition. The opponent pursued this novelty objection on appeal and filed experimental data and the further documents D15 to D20 in support thereof with its statement of grounds of appeal.

At the oral proceedings, the board decided to overturn the opposition division's decision to admit novelty as a new ground for opposition, and therefore this ground was not to be part of the appeal proceedings. The board also decided not to admit D15 to D19, the part of D20 relating to the tetraalkyltin mixture or the experimental data filed with the opponent's statement of grounds of appeal.

As the final decision is to revoke the patent, and does not adversely affect the opponent, the reasons for these decisions do not have to be provided.

19. D21 and the part of D20 relating to the use of a catalyst had been filed by the opponent in support of its argument that no catalyst was needed for the redistribution reaction in equation (1) of D13. In the board's reasoning above, which is in the opponent's favour, the board has not taken into account D21 or the part in D20 relating to the use of a catalyst.

Consequently, there was no need to decide at the oral proceedings before the board on the admittance of D21 or the part of D20 relating to this issue.

20. As the patent proprietor's requests for the admittance of D22, D23 and the experimental data filed with the letter of 15 June 2023 were only subject to the admittance of D15 to D21 and the opponent's experimental evidence filed with its statement of grounds of appeal, there was no need to decide on these requests from the patent proprietor at the oral proceedings before the board.

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:

Beschwerdekammern des Europäischen Patentamts
Boards of Appeal of the European Patent Office
Chambres de recours de l'Office européen des brevets

N. Maslin M. O. Müller

Decision electronically authenticated