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**D E C I S I O N**  
**of 29 November 2005**

**Case Number:** T 0903/02 - 3.3.01

**Application Number:** 90870177.4

**Publication Number:** 0423101

**IPC:** C07F 17/00

**Language of the proceedings:** EN

**Title of invention:**

Catalyst for producing hemiisotactic polypropylene

**Patentee:**

FINA TECHNOLOGY, INC.

**Opponent:**

The Procter & Gamble Company

**Headword:**

Metallocene/FINA TECHNOLOGY

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step (no) - obvious solution"

**Decisions cited:**

G 0009/92, G 0004/93

**Catchword:**

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Case Number: T 0903/02 - 3.3.01

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.01  
of 29 November 2005

**Appellant:** FINA TECHNOLOGY, INC.  
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**Representative:** Roufosse Micheline C.  
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**Respondent:** The Procter & Gamble Company  
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**Representative:** TER MEER - STEINMEISTER & PARTNER GbR  
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**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
6 June 2002 concerning maintenance of the  
European patent No. 0423101 in amended form.

**Composition of the Board:**

**Chairman:** A. Nuss  
**Members:** P. P. Bracke  
S. Perryman

## Summary of Facts and Submissions

I. The Proprietor of the patent in suit was the sole Appellant against the Opposition Division's decision to maintain European patent No. 0 423 101 on the basis of the second auxiliary request submitted on 3 May 2002 at the oral proceedings before the Opposition Division, which consisted of two claims reading:

"1. Isopropylidene (3-methylcyclopentadienyl-1-fluorenyl) zirconium dichloride."

"2. A metallocene catalyst comprising

- a) isopropylidene (3-methylcyclopentadienyl-1-fluorenyl) zirconium dichloride; and
- b) an ionizing agent."

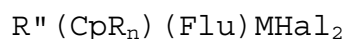
II. The Opposition Division was of the opinion that the first auxiliary request submitted on 3 May 2002 at the oral proceedings before the Opposition Division did not meet the requirement of inventive step over the teachings of *inter alia* documents

(3) EP-A-0 316 155 and

(12) J. Am. Chem. Soc. 1988, vol. 110, 18, pages 6255 and 6256.

That first auxiliary request consisted of five claims with Claim 1 reading:

"A metallocene compound comprising the general formula:



where Cp of  $CpR_n$  is cyclopentadienyl and Flu is fluorenyl, each R is a hydrocarbyl radical having from 1-20 carbon atoms and is the same or different and is selected such that Flu is a sterically different ring from  $CpR_n$  resulting in a lack of bi-lateral symmetry for the compound, R" is a structural bridge imparting stereorigidity to the compound and connecting the cyclopentadienyl moieties with each other, M is a Group 4 metal, n is from 1 to 4, and Hal is a halogen."

In particular, the Opposition Division found that from the experimental part of the patent in suit it could not be derived that a hemiisotactic polymerisation product would be obtained by using a catalyst derived from each claimed metallocene compound embraced within the scope of Claim 1. Moreover, the post-published document

(8) EP-A-0 537 130

clearly showed that the use of some presently claimed metallocene compounds as precursor of polymerisation catalysts did not result in hemiisotactic polymers. As the problem to be solved could thus only be seen in the provision of further polymerisation catalysts and metallocene compounds were known precursors of polymerisation catalysts, the claimed metallocene compounds were obviously derivable from the prior art.

III. Oral proceedings before the Board took place on 29 November 2005 in the presence of the Appellant only. The Respondent (Opponent) had announced in his letter of 28 September 2005 that he would not be represented

at the present oral proceedings but that he wished a decision taken on the basis of the written submissions, which can be summarised as follows:

metallocene compounds containing an asymmetric substituted cyclopentadienyl radical were known precursors of polymerisation catalysts for polymerising olefins; fluorenyl was also known as a suitable radical of such metallocenes; as the problem underlying the invention could only be seen in providing further precursors of catalysts for polymerising olefins, the claimed metallocenes were obviously derivable from the cited prior art.

- IV. The Appellant submitted that it had been shown in the patent in suit that the claimed metallocene compounds were suitable precursors of catalysts providing hemiisotactic polymers from olefins. Since it had not been suggested in any of the cited prior art documents that hemiisotactic polymerisation could be effected by providing asymmetric metallocenes, the claimed metallocenes were not obviously derivable therefrom.
- V. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the claims of the first auxiliary request submitted on 3 May 2002 at the oral proceedings before the Opposition Division.

The Respondent had requested in writing that the appeal be dismissed.

## Reasons for the Decision

1. The appeal is admissible.
2. In view of the fact that the patent in suit was maintained on the basis of the second auxiliary request filed at the oral proceedings before the Opposition Division and that only the Proprietor of the patent in suit filed an appeal, due to the principle of prohibition of *reformatio in peius*, the Board does not have the power to challenge the maintenance of the patent on the basis of that second auxiliary request (see G 9/92 and G 4/93, both OJ EPO, 1994, 875).

3. Inventive step of Claim 1

In accordance with the "problem-solution approach" applied by the Boards of Appeal to assess inventive step on an objective basis, it is in particular necessary to establish the closest state of the art forming the starting point, 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.

- 3.1.1 The "closest state of the art" is normally a prior art document disclosing subject-matter aimed at the same objective as the claimed invention.

Since, in the present case, none of the documents cited as prior art under Article 54(2) EPC concern the preparation of hemiisotactic polymers and, according to paragraph [0008] of the patent in suit, hemiisotactic

polymers were known from the reference cited therein, namely *Macromolecules*, 1982, Vol. 15, pages 1451 and 1452, the reference cited in paragraph [0008] of the patent in suit may qualify as the closest state of the art.

Starting from that closest state of the art, the problem underlying the invention is the provision of precursors for catalysts useful to produce hemiisotactic polymers (see paragraphs [0022] to [0025] of the patent in suit). That problem is said to be solved with the metallocene compounds according to Claim 1.

- 3.2 Therefore, the question arises, whether it has been made plausible that with all the metallocene compounds embraced within the wording of Claim 1 the problem as defined in point 3.1 above has been effectively solved.

It was not contested, that post-published document (8) (to be taken as technical expert evidence) discloses in an unambiguous way that by using metallocene compounds embraced within the wording of present Claim 1, such as isopropyl (3-t-butyl cyclopentadienyl-1-fluorenyl) zirconium dichloride, as precursor of polymerisation catalysts not hemiisotactic polymers, but isotactic polymers are obtained (see page 5, lines 5 to 10, page 6, lines 40 to 43, and examples 1 and 2).

Document (8) is thus a clear proof that not all metallocene compounds embraced within the wording of Claim 1 effectively solve the problem as defined in point 3.1 above.

- 3.3 In view of the above, only a less ambitious problem than the one described in point 3.1 above can be considered to be effectively solved by the claimed metallocene compounds, namely the provision of further precursors of catalysts for the polymerisation of olefins.
- 3.4 It was not contested that, in that case, document (12), which discloses isopropyl(cyclopentadienyl-1-fluorenyl)hafnium(IV) dichloride and its use as precursor for a catalyst in the polymerisation of propylene, represents the closest state of the art and that the problem defined in point 3.3 above is effectively solved by the claimed metallocenes.
- 3.5 Therefore, it remains to be decided whether in the light of the teachings of the cited documents a skilled person seeking to solve such problem would have arrived at the claimed metallocene compounds in an obvious way or not.
- 3.6 Document (3) is also concerned with the use of metallocene compounds as precursors of catalysts for olefin polymerisation. The metallocene compounds described therein contain two possibly substituted cyclopentadienyl moieties (see page 3, lines 26 to 42). In particular, on page 5, line 43 to page 6, line 54 several examples of such metallocene compounds are listed containing two cyclopentadienyl moieties having each a different substitution pattern, such as one unsubstituted and the other asymmetrically substituted with methyl, i-propyl, t-butyl or the like radical.



Since document (12) discloses isopropyl(cyclopentadienyl-1-fluorenyl)hafnium(IV) dichloride and its use as precursor for a catalyst in the polymerisation of propylene and from document (3) it was known that metallocenes containing asymmetrically alkyl substituted cyclopentadienyl radicals as well as metallocenes containing unsubstituted cyclopentadienyl radicals are useful as precursor for polymerisation catalysts, a skilled person would have expected that by replacing the unsubstituted cyclopentadienyl radical in the metallocene compound disclosed in document (12) by an asymmetrically alkyl substituted cyclopentadienyl radical, the metallocene compounds would still be useful as precursor of catalysts for polymerising olefins.

- 3.7 The metallocene compounds defined in Claim 1 were thus obviously derivable from the state of the art.
4. Therefore, the sole request before the Board, namely maintenance of the patent on the basis of the first auxiliary request submitted on 3 May 2002 at the oral proceedings before the Opposition Division must be refused.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

N. Maslin

A. Nuss