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**D E C I S I O N**  
**of 12 November 2003**

**Case Number:** T 0312/99 - 3.3.1

**Application Number:** 93914205.5

**Publication Number:** 0642485

**IPC:** C07C 11/02

**Language of the proceedings:** EN

**Title of invention:**  
Production of high purity olefins

**Patentee:**  
ExxonMobil Chemical Patents Inc.

**Opponent:**  
UOP

**Headword:**  
High purity olefins/EXXON

**Relevant legal provisions:**  
EPC Art. 54

**Keyword:**  
"Novelty (main and auxiliary request) - no"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0312/99 - 3.3.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.1  
of 12 November 2003

**Appellant:** ExxonMobil Chemical Patents Inc.  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 16 February 1999  
revoking European patent No. 0642485 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** A. J. Nuss  
**Members:** J. M. Jonk  
R. T. Menapace

## Summary of Facts and Submissions

- I. The Appellant (Proprietor of the patent) lodged an appeal against the decision of the Opposition Division revoking the European patent No. 0 642 485 (European patent application No. 93 914 205.5).
- II. The opposition was filed against the patent as a whole, and based on the grounds of lack of novelty and inventive step as indicated in Article 100(a) EPC, and lack of sufficiency within the meaning of Article 100(b) EPC. It was supported by several documents including:
- (1) US-A-4 677 243.
- III. The decision of the Opposition division was based on Claims 1 to 11 filed on 2 February 1999, independent Claim 1 reading as follows:
- "A process for selectively catalytically converting a starting material comprising an oxygenate, or a substituted paraffin which is a halide, a mercaptan, a sulfide or an amine, to one or more high purity olefins, which process comprises:
- (a) contacting the starting material at a weight hourly space velocity (WHSV) of from 0.01 hr<sup>-1</sup> to 100 hr<sup>-1</sup>, and at a temperature of from 350°C to 550°C, with a molecular sieve catalyst comprising ZSM-48, a ferrosilicate zeolite or a silicoaluminophosphate (SAPO), which molecular sieve catalyst, in the case of ZSM-48 or ferrosilicate zeolites has a silica-to-Me<sub>2</sub>O<sub>3</sub> molar

ratio (where Me is a Group IIIA or VIII element) of from 300 to 2500, and

(b) recovering the one or more high purity olefins without the use of superfractionation."

IV. The Opposition Division held that the subject-matter of said Claim 1 was novel, that the amendments to Claim 1 as granted met Article 123 EPC, and that the subject-matter of present Claim 1 also met the requirement of sufficiency within the meaning of Article 83 EPC. It also held that the claimed subject-matter was novel over document (1) in view of step (b), namely the recovery of high purity olefins without the use of superfractionation. However, it concluded that the subject-matter of present Claim 1 did not involve an inventive step in the light of document (1).

V. Oral proceedings before the Board were held on 12 November 2003.

VI. The Appellant finally defended the patentability of the subject-matter of the patent in suit on the basis of a new main request and an auxiliary request both filed during the oral proceedings before the Board.

Claim 1 of the main request corresponded to the one considered by the Opposition Division.

Claim 1 of the auxiliary request corresponded to that of the main request, except that

- the catalyst used in step (a) was restricted to a catalyst comprising a silicoaluminophosphate (SAPO), and

- after step (b) the following features were inserted:

"said process being carried out in a continuous fashion by use of the molecular sieve catalyst in any system of a variety of transport beds."

The Appellant argued concerning novelty that the subject-matter of Claim 1 of the main request differed from the process as disclosed in document (1) only in that the claimed process of the patent in suit excluded the use of a conventional superfractionator for separating the paraffins from the olefins (in particular, propane from propylene), and that the subject-matter of Claim 1 of the auxiliary request additionally differed from the process of document (1) in that the process of said Claim 1 was carried out in a continuous fashion using the catalyst in the form of a transport bed system.

VII. The Respondent (Opponent) disputed that Claim 1 of the present main request and Claim 1 of the present auxiliary request met the formal requirements of Articles 84 and 123 EPC. Furthermore, he considered that the subject-matter of Claim 1 of the main request lacked novelty in view of document (1), since the exclusion of the use of a superfractionator in said claim was meaningless, because document (1) did not disclose the use of a superfractionator, and also because there was actually no need for the use of a superfractionator in those cases in which already high

purity olefins within the meaning of the patent in suit were obtained. He also found that the subject-matter of Claim 1 of the auxiliary request lacked novelty, because document (1) disclosed the use of a transported catalyst bed system as a preferred embodiment.

VIII. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the claims filed as main or auxiliary request at the oral proceedings.

The Respondent requested that the appeal be dismissed.

IX. At the conclusion of the oral proceedings the Board's decision was pronounced.

### **Reasons for the Decision**

1. The appeal is admissible.

#### *Formal matters*

2. Having regard to the Board's findings indicated below concerning the novelty of the subject-matter of the present claims, the Board sees no need to deal with the formal objections submitted by the Respondent under Articles 84 and 123 EPC.

#### *Novelty (main request)*

3. The Appellant acknowledged that document (1) relates to a process for preparing olefins by a method

corresponding to that of Claim 1 of the main request, but he defended the novelty of the claimed process by arguing that the use of a superfractionation was implicitly a mandatory feature of the process of document (1), whilst said use was excluded from the process of Claim 1.

3.1 In this context, the Appellant did not dispute that document (1) was totally silent about the use of a superfractionation for the recovery of the olefins.

Moreover, he did not dispute that the calculations provided in Annex 1 to the opposition statement of 1 May 1997 showed that the degree of purity reported in document (1) for the olefins in the effluents from the tubular reactor in Example 2, Table II-A (first and second column), Example 4, Table IV-A (first column), Example 7, Table VII-A (second column), Example 9, Table XI-A (third column) and Example 12, Table XIV-A (second column) met the degree of purity of high purity olefins and that of polymer grade propylene as defined in the patent in suit (see page 2, lines 31 to 32 and 46 to 48).

In these circumstances, the Board finds that the skilled person would rather conclude from document (1) that, at least in those cases in which the effluents from the reactor already contained high purity olefins, a superfractionator for separating the low levels of paraffins having the same number of carbons, in particular propane from propylene, would not be required. In this context, it is the Board's position that in the absence of any indication to the contrary other low level impurities in the effluent from the

reactor could be removed by a variety of processes without the need of a superfractionator. This point of view is indeed confirmed by the patent in suit (see page 2, lines 32 to 39).

- 3.2 Therefore, the Board concludes that document (1) does not directly and unambiguously disclose the use of a superfractionation for the recovery of the high purity olefins, that this lack of disclosure renders the exclusion of the use of a superfractionation in present Claim 1 meaningless, and that consequently the main request fails because of lack of novelty of the subject-matter of Claim 1.

*Novelty (auxiliary request)*

4. Claim 1 of this request is restricted to the use of a silicoaluminophosphate (SAPO) as catalyst, and the performance of the conversion in a continuous fashion by applying a transport catalyst bed.

- 4.1 In view of the fact that all the examples of document (1) mentioned above (point 3.1, second paragraph) producing high purity olefins have been carried out with SAPO-34 as catalyst, the considerations concerning novelty for the main request also apply to this request.

- 4.2 Therefore, the question to be answered is whether document (1) also takes away the novelty of the now claimed process involving the conversion of the reactants in a continuous way using a transported catalyst bed.



- 4.3 Document (1) discloses that the process for preparing the light olefins can be carried out in a batch, semi-continuous, or continuous fashion (see column 8, lines 31 and 32). Moreover, it teaches that, owing to the nature of the process, it may be desirable to carry out the instant process by use of the SAPO-catalyst in any system of a variety of transport beds rather than in a fixed bed, since such a system would readily provide for any regeneration of the SAPO-catalyst, in particular by introducing the catalyst as a moving bed to a regeneration zone where it can be regenerated (see column 8, lines 40 to 56).
- 4.4 Therefore, the Board concludes that the disclosure of document (1) as a whole directly and unambiguously makes available to the skilled person a process for preparing high purity olefins falling within the scope of Claim 1 of the auxiliary request.
- 4.5 Thus, the auxiliary request also fails for the reason of lack of novelty of the subject-matter of Claim 1.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

N. Maslin

A. Nuss