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**D E C I S I O N**  
of 19 April 2001

**Case Number:** T 1222/97 - 3.3.1

**Application Number:** 94306172.1

**Publication Number:** 0640584

**IPC:** C07C 209/84

**Language of the proceedings:** EN

**Title of invention:**

Decolorization of polyethylene polyamines using ruthenium

**Applicant:**

UNION CARBIDE CHEMICALS & PLASTICS TECHNOLOGY CORPORATION

**Opponent:**

-

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 123(2)

EPC R. 71(2)

**Keyword:**

"Main and sole request - support by the application as filed  
(no) "

**Decisions cited:**

-

**Catchword:**

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Case Number: T 1222/97 - 3.3.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.1  
of 19 April 2001

**Appellant:**

UNION CARBIDE CHEMICALS & PLASTICS  
TECHNOLOGY CORPORATION  
39 Old Ridgebury Road  
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Connecticut 06817-0001 (US)

**Representative:**

Green, Mark Charles  
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30 Welbeck Street  
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**Decision under appeal:**

Decision of the Examining Division of the  
European Patent Office posted 29 July 1997  
refusing European patent application  
No. 94 306 172.1 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** A. J. Nuss  
**Members:** P. F. Ranguis  
S. C. Perryman

## Summary of Facts and Submissions

- I. This appeal lies from the Examining Division's decision refusing the European patent application No. 94 306 172.1 (Publication No. 0 640 584) on the ground that Claim 1 of the then pending request did not comply with the requirements of Article 123(2) EPC.
- II. Said request contained six claims, Claim 1 (the sole independent claim), reading as follows:
- "1. A continuous process for reducing the color of a polyalkylene polyamine product, whilst restricting degradation of the polyamine product to less than 3%, comprising contacting the product at elevated temperature and pressure with a catalytically effective amount of a hydrogenation catalyst in the presence of a hydrogen-containing atmosphere, characterised in that the catalyst is ruthenium on alumina having a lifetime of at least 1000 hours."
- III. The Examining division held that the expression "whilst restricting degradation of the polyamine product to less than 3%" could not be derived from the application as filed for all the polyamines encompassed by the then pending Claim 1.
- IV. In the statement of grounds of appeal, the Appellant abandoned the request which was refused and filed two other sets of claims as main and first auxiliary requests, Claims 1 of both requests reading as follows:

### main request

"1. A continuous process for reducing the color of a polyalkylene polyamine product, whilst restricting degradation of the polyamine product to less than 3%,

comprising contacting the product at elevated temperature and pressure with a catalytically effective amount of a hydrogenation catalyst in the presence of a hydrogen-containing atmosphere, characterised in that the catalyst is ruthenium on an alumina support having a lifetime of at least 1000 hours."

**auxiliary request**

"1. A continuous process for reducing the color of a polyalkylene polyamine product wherein the greatest single component is triethylenetetramine or tetraethylenepentamine whilst restricting degradation of the polyamine product to less than 3%, comprising contacting the product at elevated temperature and pressure with a catalytically effective amount of a hydrogenation catalyst in the presence of a hydrogen-containing atmosphere, characterised in that the catalyst is ruthenium on an alumina support having a lifetime of at least 1000 hours."

- V. In a first communication of the Board of Appeal accompanying the summons to oral proceedings, it was pointed out that both newly submitted requests might contravene the requirements of Article 123(2) EPC. The Board emphasized, in particular, that the still present expression "whilst restricting degradation of the polyamine product to less than 3%" might not be derived from the application as filed for any temperature. In particular, it was observed that at a temperature of 165°C the degradation was as high as 16% and 11% (cf. examples 2 and 3 respectively).
- VI. In response, the appellant abandoned its previous requests and filed as sole request a set of four claims, Claim 1 reading as follows:

"1. A continuous process for reducing the color of a polyalkylene polyamine product wherein the greatest single component is triethylenetetramine or tetraethylenepentamine whilst restricting degradation of the polyamine product to less than 3%, comprising contacting the product at elevated pressure and a temperature of 150°C with a catalytically effective amount of a hydrogenation catalyst in the presence of a hydrogen-containing atmosphere, characterised in that the catalyst is ruthenium on an alumina having a lifetime of at least 1000 hours."

Furthermore, he argued that Claim 1 was now limited to a process carried out at 150°C, which was the temperature where degradation of less than 3% occurred as set out in Examples Nos. 1 and 4.

- VII. In a second communication, the Board emphasized that Claim 1 of the then pending request might not be in compliance with the requirements of Article 123 (2) and that the appeal was likely to be dismissed.
- VIII. Oral proceedings before the Board were held on 19 April 2001. The Appellant, having been duly summoned, informed the Board that he would not be represented at these oral proceedings. They thus took place in the absence of the Appellant (Rule 71(2) EPC).
- IX. The Appellant requested in writing that the decision under appeal be set aside and that a patent be granted on the basis of Claims 1 to 4 received on 11 January 2001, together with a description yet to be amended.

## Reasons for the Decision

1. The appeal is admissible.
2. *Article 123(2) EPC*
  - 2.1 Claim 1 of the pending request differs from Claim 1 as originally filed by several amendments. Some of them find support in the application as originally filed, namely:
    - "continuous" process (see application as originally filed on page 4, line 21),
    - "polyalkylene polyamine product wherein the greatest single component is triethylenetetramine or tetraethylenepentamine" (see application as originally filed on page 4, line 3 and lines 11 to 14),
    - "the catalyst is ruthenium on an alumina support having a life time of at least 1000 hours" (see application as filed on page 3, line 30 and page 6, lines 9 to 10).
  - 2.2 However, the critical point to decide is whether the expression "whilst restricting degradation of the polyamine product to less than 3%" in combination with a temperature of 150°C may be derived directly and unambiguously from the application as filed for all the embodiments encompassed by the now claimed subject matter. In other terms, the question is whether it can be derived from the application as filed that at 150°C, for all the claimed embodiments, less than 3% of degradation of polyamine product occurs.

2.3 Mention of less than 3% product degradation can be found in the application as filed on page 7, second paragraph, said paragraph reading as follows:

"In addition, Raney Nickel catalyst was also tested for ethylene-amines decolorization. However, it was found that, at the effective decolorization conditions (which usually means higher temperatures or lower feed rates), unacceptable product degradation was obtained ( $\geq 10\%$ ). Indeed, nickel-based catalyst will cause a great deal of product degradation for both TETA and TEPA. By way of contrast, with the ruthenium on alumina catalyst, less than 3% product degradation can be obtained (Example 1, herein). Thus, for the reasons given, the Raney Ni and Pd/C, though taught by U.S Pat. No. 4 766 247, are found unsuitable for the purposes of this invention".

2.4 The sentence on page 7 "By way of contrast, with the ruthenium on alumina catalyst, less than 3% product degradation can be obtained (Example 1, herein)" can only be taken as an indication that in some circumstances, specifically the circumstances of Example 1, with a temperature of 150°C, and for specific TEPA, hydrogen and other feed rates, with a specific quantity of Ruthenium on alumina catalyst, less than 3% product degradation can be obtained. From this sentence alone no deductions can be made as to what variations of the conditions of Example 1 will still lead to less than 3% product degradation. Example 2 shows that raising the temperature to 165°C while keeping the other conditions of Example 1 the same, produces more than 3% degradation, and Example 3 shows that raising the temperature to 165°C, and increasing the feed rate of TEPA from 30g/hr to 50g/hr while keeping the other conditions of Example 1 also produces more than 3% degradation. The conclusion which can be drawn from these examples is stated as follows in the

application as filed at page 5, lines 20 to 22 "The results suggest that by controlling reaction conditions, such as temperature and feed rate (underlining by the board), low color TEPA product with minimum product degradation can be obtained." However none of this provides a basis for the subject matter of present claim 1 which singles out as critical only the use of the ruthenium on alumina catalyst at a temperature of 150°C to produce less than 3% product degradation, and places no restrictions on feed rate or other parameters mentioned in Example 1. There is no basis in the application as filed for making such a generalization of the specific conditions of Example 1, even if taken in combination with Example 4, so the present claim 1 does not meet the requirements of Article 123(2) EPC.

2.5 As Claim 1 of this request is not in conformity with Article 123 (2) EPC and a decision can only be taken on a request as a whole, none of the further claims of that request need to be examined.

**Order**

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

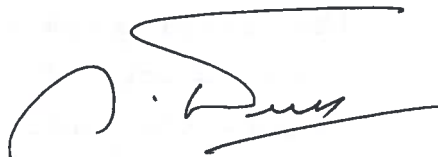
The appeal is dismissed.

The Registrar:



N. Maslin

The Chairman:



A. Nuss