

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte

EDWAR S. SHAMSHOUM and  
CHRISTOPHER BAUCH

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Appeal No. 1999-1833  
Application No. 08/480,728

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ON BRIEF

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Before OWENS, WALTZ, and LIEBERMAN, Administrative Patent Judges.  
LIEBERMAN, Administrative Patent Judge.

**DECISION ON APPEAL**

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner refusing to allow claims 18 through 31 and 33, which are all the claims pending in this application.

## THE INVENTION

The invention is directed to a process for the polymerization of olefins wherein the catalyst is contacted with a lithium compound selected from the group consisting of lithium cyclopentadienide and lithium indene. Additional limitations are forth in the following illustrative claim.

## THE CLAIMS

Claims 18, 19 and 33 are illustrative of appellants' invention and are reproduced below.

18. A process for the polymerization of olefins comprising:

- a) selecting a conventional supported Ziegler-Natta transition metal compound catalyst component wherein the transition metal compound is of the general formula  $MR^+_x$  where M is the metal, R is a halogen or a hydrocarboxyl and x is the valence of the metal;
- b) contacting the catalyst component with a lithium compound chosen from the group consisting of lithium cyclopentadienide and lithium indene;
- c) forming a catalyst by contacting the catalyst component/lithium compound mixture with an aluminum trialkyl co-catalyst described by the formula  $AlR'_3$  where R' is an alkyl of from 1-8 carbon atoms and R' may be the same or different; and
- d) contacting the catalyst with an external electron donor either simultaneously with or after step (b), said external electron donor having the general formula  $SiR_m(OR')_{4-m}$ , where R is selected from the group consisting of an alkyl group, a cycloalkyl group, an aryl group and a vinyl group; R' is an alkyl group; and m is 0-3, wherein when R is an alkyl group, R may be identical with R'; when m is 0, 1 or 2, the R' groups may be identical or different; and when m is 1, 2 or 3, the R groups may be identical or different; and

e) introducing the catalyst into a polymerization reaction zone containing an olefin monomer; and

f) extracting polymer product from the reactor.

19. A process as in Claim 18 wherein the molar ratio of lithium compound/transition metal is at least 0.2.

33. A process as in Claim 32 wherein the compound is lithium indene.

### **THE REFERENCES OF RECORD**

As evidence of obviousness, the examiner relies upon the following references:

Raich	3,334,079	Aug. 01, 1967
Kioka et al. (Kioka)	5,247,031	Sep. 21, 1993
Bohmer et al. (Bohmer)	5,276,115	Jan. 04, 1994
Kataoka et al. (Kataoka)	5,331,071	Jul. 19, 1994
Numao et al. (Numao)	5,391,660	Feb. 21, 1995

### **THE REJECTION**

Claims 18 through 31 and 33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kioka in view of Bohmer, Kataoka, Numao and Raich.

### **OPINION**

We have carefully considered all of the arguments advanced by the appellant and the examiner and agree with the examiner that the rejection of claims 18 through 31 under 35 U.S.C. § 103(a) is well founded. Accordingly, we affirm this rejection. We agree with the appellants that the rejection of claim 33 is not well founded. Accordingly, we reverse this rejection.

As an initial matter, appellants submit that, “[s]eparate arguments will be made for Claims 18 and 20-33, for Claim 19 and for Claim 33.” See Brief, page 4. Accordingly, separate consideration is given to each of the aforesaid claims. See 37 CFR § 1.192(c)(7) and (8)(1997).

### **The Rejection under § 103(a)**

It is the position of the examiner that although, “Kioka discloses all the essential limitations of claim 18, the generic claim, except for the addition of the claimed lithium compounds.” See Answer, page 5. Each of the secondary references is thereafter relied upon to suggest the addition of the lithium compounds to the catalyst of Kioka. Significantly, the appellants’ argument is directed exclusively to the combination of either of the lithium compounds in a process for the polymerization of olefins. See Brief, page 4. The appellants state, “[n]either Kioka et al, Bohmer et al, Numao et al nor Raich et al, individually or in combination, teach, disclose or suggest lithium cyclopentadienide or lithium indene in a process for the polymerization of olefins.” Id. Accordingly, we adopt the examiner’s findings and conclusion to the extent that Kioka discloses each of the limitations of the claimed subject matter other than the addition of the lithium compounds.

The secondary reference to Bohmer discloses that the addition of cyclopentadiene to a Ziegler type catalyst system increases the molecular weight of olefin obtained in a polymerization process. See column 1, lines 46-49, column 2, lines 9-16, column 3, lines 47-50 and column 4, lines 35-40. The increase in molecular weight obtained however is a result of the addition of cyclopentadiene in and of itself. It does not provide evidence that utilization of a lithium cyclopentadienide would have the effect on the molecular weight of an olefin obtained in the same or a similar polymerization process. We conclude that Bohmer fails to support the examiner's conclusion that "[i]t would be obvious [sic] [it would have been obvious] to contact the catalyst of Kioka with a lithium cyclopentadienide or lithium indene." See Answer, page 3.

Similarly, the reference to Kataoka discloses a catalyst system for the polymerization of olefinic monomers comprising cyclopentadiene and indene among other components disclosed. However, even if the examiner was correct in his conclusion that the addition of cyclopentadiene compound increases the molecular weight of an olefinic polymer obtained in a polymerization process, the presence of cyclopentadiene or indene does not provide evidence that utilization of lithium cyclopentadienide or lithium indene would have the same effect on the molecular weight of an olefin obtained in the same or a similar polymerization process. We conclude that Kataoka likewise fails to support the

examiner's conclusion that "[i]t would be obvious [sic] [it would have been obvious] to contact the catalyst of Kioka with a lithium cyclopentadienide or lithium indene." See Answer, page 3.

The Numao reference is directed to a catalyst composition utilized in the polymerization of olefins, wherein the catalyst comprises an alkali metal salt of cyclopentadiene or indene. See Abstract, column 1, line 54 to column 2, line 23, column 8, line 50 to column 10, line 10 and column 10, lines 45 to column 11, line 65. Numao however, is directed to a unitary catalytic system obtained by combining numerous components. There is no specific teaching or suggestion that the polyolefin obtained having a high molecular weight results from the addition of lithium cyclopentadiene or lithium indene to the catalyst. Accordingly, we conclude that there is no motivation to add the lithium compounds disclosed by Numao to the catalyst system of Kioka.

In contrast, we find that Raich discloses a method for the polymerization of isotactic polypropylene wherein the presence of alkali metal cyclopentadienide substantially reduces the formation of atactic polypropylene. See Example I and II. We further find that in the prior polymerization of propylene with a heterogeneous catalyst system comprising  $\text{TiCl}_3$  with aluminum trialkyl such as  $\text{AlEt}_3$  there is a substantial portion

of amorphous or atactic polymer formed. See column 1, lines 16-22. In comparison, we

find that the catalyst system of the reference comprises a mixture of a trialkyl aluminum, a halide of titanium and a metal derivative of cyclopentadiene. See column 1, line 71 to column 2, lines 21. The metal salt of cyclopentadiene includes alkali metal salts such as lithium. *Id.* We find that among a limited number of cyclopentadiene derivatives lithium cyclopentadienide is specifically disclosed. See column 3, lines 1-6. With respect to the limitation of claim 19, directed to the molar ratio of lithium compound to transition metal being at least 0.2, we find that the molar ratio is encompassed by the disclosure that, “[t]he amount of cyclopentadienyl compound included in the catalyst mixture is generally in the range of 0.01 to 0.5 mole per mole of titanium halide.” See column 3, lines 12-15. We further find that Example I utilizes 2 millimoles of  $\alpha$ -TiCl<sub>3</sub>. We find that Example II repeating the procedure of Example I utilizing sodium cyclopentadienide discloses 0.5 millimoles of the alkali metal cyclopentadienide and 2 millimoles of the alpha titanium trichloride. We conclude that the ratio of alkali metal cyclopentadienide to transition metal required by the claimed subject matter is disclosed by Raich.

Based upon the above findings and analysis, we conclude that it would have been obvious to the person having ordinary skill in the art to have added lithium cyclopentadienide of Raich to the catalyst of Kioka for the purpose of decreasing the amount of atactic polyolefin obtained and increasing the amount of isotacticity.

Accordingly, the examiner has established a *prima facie* case of obviousness with respect to

claims 18 and 20 through 31.

Moreover, we do not consider the rejection over Kioka in view of Raich in the absence of the additional secondary references to constitute a "new ground" of rejection. The issue, in this respect, is whether appellants have had a fair opportunity to react to the thrust of the rejection. *In re Kronig*, 539 F.2d 1300, 1302-03, 190 USPQ 425, 426-27 (CCPA 1976). Limiting the discussion to the evidence contained in Kioka and Raich while using the same basis and teachings as the examiner relied upon does not constitute a new ground of rejection. *See Kronig*, 539 F.2d at 1303, 190 USPQ at 427; *In re Bush*, 296 F.2d 491, 496, 131 USPQ 263, 266-67 (CCPA 1961).

As a rebuttal to the *prima facie* case of obviousness, appellants rely on the data presently set forth in Examples 1 to 6 of the specification establishing "unexpected results" See Brief, pages 5 through 7. Having reviewed the data present, we conclude that appellants have not met their burden of showing unexpected results. *In re Klosak*, 455 F.2d 1077, 1080, 173 USPQ 14, 16 (CCPA 1972). It is not sufficient to assert that the results obtained are unusual or unexpected. The burden of showing unexpected results rests on they who assert them.

Furthermore, having reviewed the data present, we conclude that the showing in Tables 1 to 4 is not commensurate in scope with the degree of protection sought by the claimed subject matter and are in agreement with the examiner's conclusion, Answer, page

6. See *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 778 (Fed. Cir. 1983); *In re Tiffin*, 448 F.2d 791, 792, 171 USPQ 294, 294 (CCPA 1971). It is well settled that "[O]bjective evidence of nonobviousness must be commensurate in scope with the claims." (quoting *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972); *In re Dill*, 604 F.2d 1356, 1361, 202 USPQ 805, 808 (CCPA 1979) ("The evidence presented to rebut a prima facie case of obviousness must be commensurate in scope with the claims to which it pertains.")).

The evidence submitted is limited to 6 examples directed to the combination of an additive with a catalyst. The specific catalyst is undisclosed. We find the examples are directed to a single trialkyl aluminum compound, i.e., triethylaluminum. We find that the examples are directed to a single external electron donor cyclohexylmethyldimethoxy-silane. We find that the ratio of lithium compound to transition metal is 0.2 to 1.0. The claimed subject matter however, is directed to an entire class of catalyst, as opposed to the single undisclosed catalyst utilized in Examples 1 to 6. In addition, the claimed subject matter is directed to electron donors falling within the class having the general formula  $\text{SiR}_m(\text{OR}')_{4-m}$ . We further find that the claimed subject matter is directed to the polymerization of olefins, whereas Example 1 to 6 is directed to the polymerization of propylene. It cannot be determined from the data submitted that an increase in molecular weight and a decrease in xylene solubles would result from the utilization of other catalysts,

other electron donors, other olefins, a greater mole ratio of lithium compound to transition metal or a change in the conditions of reaction.

Accordingly, based on our consideration of the totality of the record before us, and having evaluated the *prima facie* case of obviousness in view of appellants arguments and evidence, we conclude that the preponderance of evidence weighs in favor of obviousness of the claimed subject matter within the meaning of § 103. See *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

### Claim 33

As to claim 33 directed to lithium indene, neither of the remaining references to Kioka nor Raich disclose the addition of lithium indene to a Ziegler catalyst. Accordingly, with respect to claim 33 no *prima facie* case of obviousness has been established.

## DECISION

The rejection of claims 18 through 31 under 35 U.S.C. § 103(a) as being unpatentable over Kioka in view of Raich is affirmed.

The rejection of claim 33 under 35 U.S.C. § 103(a) as being unpatentable over Kioka in view of Bohmer, Kataoka, Numao and Raich **is reversed**.

The decision of the examiner is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

**AFFIRMED-IN-PART**

TERRY J. OWENS	)	
Administrative Patent Judge	)	
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	)	
	)	BOARD OF PATENT
THOMAS A. WALTZ	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
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PAUL LIEBERMAN	)	
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