UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/358,835	01/23/2009	Charles John Talkowski	PP0042USNA	3258

23906 7590 05/24/2013

E I DU PONT DE NEMOURS AND COMPANY
LEGAL PATENT RECORDS CENTER
BARLEY MILL PLAZA 25
4417 LANCASTER PIKE
WILMINGTON, DE 19805

EXAMINER	
JONES JR., ROBERT STOCKTON	
ART UNIT	PAPER NUMBER
1762	

NOTIFICATION DATE	DELIVERY MODE
05/24/2013	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-Legal.PRC@usa.dupont.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CHARLES JOHN TALKOWSKI

Appeal 2012-002290
Application 12/358,835
Technology Center 1700

Before FRED E. McKELVEY, GEORGE C. BEST and DONNA M. PRAISS, *Administrative Patent Judges*.

McKELVEY, *Administrative Patent Judge*.

DECISION ON APPEAL

Statement of the case

E.I. du Pont de Nemours and Company ("applicant"), the real party in interest (Brief, page 1), seeks review under 35 U.S.C. § 134(a) of a final rejection dated 22 December 2010.

The application was filed in the USPTO on 23 January 2009.

The application on appeal claims priority of Provisional Application 61/023,220, filed 24 January 2008.

The application has been published as U.S. Patent Application Publication 2009/0192268 A1 (30 July 2009).

In support of prior art rejections, the Examiner relies on the following evidence.

Chen et al. "Chen"	U.S. Patent 5,554,120	10 Sept. 1996
Kurian et al. "Kurian"	U.S. Patent 6,245,844 B1	12 June 2001
Rolland et al. "Rolland"	U.S. Published Patent Application 2005/0112372 A1	26 May 2005
Wakabayashi et al. "Wakabayashi 1"	*Coassembly of Fatty Acid Salts and Semicrystalline Ionomers*, AMERICAN PHYSICAL SOCIETY ABSTRACT #N17.004 APS March 2003 meeting	Mar. 2003
C. E. Carraher, Jr. "Carraher"	POLYMER CHEMISTRY, pages 49-53 (ISBN 0-203-91130) (6th ed.)	2003

Applicant does not contest the prior art status of the Examiner's evidence.

We mention the following additional evidence in this opinion:

Wakabayashi et al. "Wakabayashi 2"	*Ethylene/(meth)acrylic acid ionomers plasticized and reinforced by metal soaps*, 47 POLYMER 2874-2883	2006
K. Wakabayashi "Wakabayashi 3"	*Structure-Property Relationships in Semicrystalline Copolymers and Ionomers*, Ph.D. Thesis Princeton University	Jan. 2006

We have jurisdiction under 35 U.S.C. § 134(a).

Claims on appeal

Claims 1-20 are on appeal. Brief, page 1; Answer, page 3.

Claim 1, which we reproduce from the Claims Appendix of the Brief (page 15), reads [matter in brackets and some indentation added; principal limitations in issue in italics]:

> A thermoplastic composition comprising or produced from, based on the weight of the thermoplastic composition, [A] about 70 to about 99.8 % of a polyester composition and [B] a modifier wherein
>
> [1] the polyester composition [A] comprises poly(trimethylene terephthalate) or poly(tetramethylene terephthalate), or combinations thereof;
>
> [2] the modifier [B] comprises [2.1] *at least one aliphatic, monofunctional organic acid*, [2.2] *at least one ionomer derived from an ethylene acid copolymer*, and [2.3] optionally at least one ethylene ester copolymer;
>
> [3] the organic acid [2.1] has 4 to 36 carbon atoms, optionally substituted with a C_{1-8} alkyl group;

[4] the [ethylene] acid copolymer [basis of ionomer 2.2] comprises [4.1] copolymerized comonomers of ethylene, [4.2] ~~a~~[1] copolymerized comonomers of at least one C_{3-8} α,β-ethylenically unsaturated carboxylic acid, and [4.3] optionally a copolymerized comonomer of at least one C_{3-8} α,β-ethylenically unsaturated carboxylic acid ester;

[5] the ethylene ester copolymer [2.3] ~~wherein~~ [2] comprises, based on the weight of the ethylene ester copolymer,

(i) about 20 to about 95% of copolymerized units of ethylene,

(ii) 0 to about 25% of copolymerized units of at least one ester of the formula $CH_2=C(R^1)CO_2R^2$, and

(iii) 0 to about 80 ~~weight~~[3] % of copolymerized units of at least one ester of the formula $CH_2=C(R^3)CO_2R^4$;

[wherein] (ii) and (iii) cannot both be 0 ~~weight~~[4] %;

R^1 is hydrogen or an alkyl group having 1 to 6 carbon atoms;

R^2 is a glycidyl group;

R^3 is hydrogen or an alkyl group having 1 to 8 carbon atoms; and

R^4 is an alkyl group having 1 to 8 carbon atoms;

---

1 The word "a" appears to be unnecessary.

2 The word "wherein" appears to be unnecessary.

3 The word "weight" appears to be unnecessary in view of the language "based on the weight of the ethylene ester copolymer" set out earlier in the claim.

4 *See* n.3.

[6] from about 75 % to about 100 % of the combined acid moieties in the modifier [B] are neutralized to form salts with metal cations; and

[7] the cations [6] comprise at least about 75 equivalent % of *magnesium, calcium, zinc, or combinations of two or more thereof.*

The rejections

In the Answer, the Examiner maintains the following rejections.

Rejection 1: Claims 1-4, 14-16 and 18-19 stand rejected under § 103 as being unpatentable over Chen and Wakabayashi 1. Answer, page 5.

In presenting its appeal, applicant does not separately argue the patentability of Claims 2-4, 14-16 and 18-19 apart from Claim 1. Accordingly, we address only Claim 1. 37 C.F.R. § 41.37(c)(1)(vii).

Rejection 2: Claims 5-7 stand rejected under § 103 as being unpatentable over Chen, Wakabayashi 1 and Rolland. Answer, page 11.

In presenting its appeal of Rejection 2, applicant does not make an argument apart from the arguments presented with respect to Rejection 1. The patentability of Claims 5-7 therefore stands or falls with the patentability of Claim 1.

Rejection 3: Claims 8-9, 12-13, 17 and 20 stand rejected under § 103 as being unpatentable over Chen, Wakabayashi 1 and Kurian. Answer, page 13.

In presenting its appeal of Rejection 3, applicant does not make an argument apart from the arguments presented with respect to Rejection 1. The patentability of Claims 8-9, 12-13, 17 and 20 therefore stands or falls with the patentability of Claim 1.

Rejection 4: Claims 10-11 stand rejected under § 103 as unpatentable over Chen, Wakabayashi 1, Kurian and Rolland. Answer, page 16.

In presenting its appeal of Rejection 4, applicant does not make an argument apart from the arguments presented with respect to Rejection 1. The patentability of Claims 10-11 therefore stands or falls with the patentability of Claim 1.

Analysis

Background

A Background of the Invention portion of applicant's Specification states (page 1:16 to page 3:12; *see also* Brief, page 6) (bold added):

> Thermoplastic polymers are commonly used to manufacture various shaped articles that may be utilized in applications such as automotive parts, food containers, signs, and packaging materials. Shaped articles may be prepared from polyester by a number of melt extrusion processes known in the art, such as injection molding, compression molding, blow molding, and profile extrusion.
>
> The most common polyester currently used is **p**oly**e**thylene **t**erephthalate (PET). Due to recent trends toward sustainability and reduced use of petroleum, alternatives to PET are being investigated. **P**oly(**t**rimethylene **t**erephthalate), herein abbreviated 3GT, also referred to as PTT or polypropylene terephthalate, may be useful in many materials and products . . . . 3GT has properties including a semi-crystalline molecular structure.
>
> British Patent 578097 disclosed the synthesis of 3GT in 1941. 3GT may be prepared using 1,3-propanediol derived from petroleum sources or from biological processes using renewable resources ("bio-based" synthesis). The ability to prepare 3GT from renewable resources makes it an attractive alternative to PET.
>
> * * *

> Use of reinforcements [in 3GT] may lead to higher viscosity, poor surface gloss, and poor scratch and mar resistance and other esthetic effects. The increased interest in 3GT as a replacement for PET is [said to be] prompting the use of 3GT in applications that do not permit the use of reinforcing materials. These applications using unreinforced 3GT may have problems with inadequate impact resistance and/or moisture concerns when 3GT with lower IV [intrinsic viscosity] is used.
>
> Another polyester of interest is poly(tetramethylene terephthalate), herein abbreviated 4GT, also referred to as PBT or **p**oly**b**utylene **t**erephthalate.
>
> * * *
>
> Using higher viscosity polyester may improve impact resistance, but the high viscosity may lead to processing difficulties. Higher viscosity polymers may decompose at higher temperatures and may have thermal limits that preclude viscosity reduction by operating at very high temperatures.
>
> * * *
>
> Methods to lower viscosity and thereby improve injection molding of 3GT compositions, while simultaneously maintaining as much "bio-based" content as possible, are desirable. Increasing toughness and/or impact resistance is also desirable.

According to applicant:

> polyesters require better mechanical strength for making suitable articled [*sic*, articles] for society's daily use such as bottles for water, soft drinks, etc. As disclosed in . . . [the portion of the Specification

> reproduced *supra*], improving such mechanical strength inevitably increases the melt viscosity of PTT thereby making the PTT more difficult to be melt-processed because it is less fluid at melt temperatures and may decompose. Producing a higher molecular weight PTT also improves the mechanical strength, but also increases the PTT melt viscosity. Use of impact modifier (reinforcement) may also increase the mechanical strength, but inevitably increase[s] the melt viscosity, again, making the PTT more difficult to be melt-processed.

Brief, page 5 (with some minor grammatical modifications to the quoted material).

Applicant says that the problem it sought to address "was . . . how to eliminate the increase in melt viscosity of PTT, as a result of the modification by addition of impact modifier to the PTT." Brief page 5. Applicant goes on to say that it would have been "[e]ven more desirable . . . to reduce the absolute melt viscosity of the PTT without substantial reduction in molecular weight and consequently avoid the loss of mechanical strength of the PTT." *Id.*

Chen

Chen's invention relates generally to polymer blends that can be extruded, molded, or otherwise formed into articles of manufacture having certain desired characteristics. Chen, col. 1:9-12. For example, the Chen polymer blends can be processed to form medical catheters. More particularly, Chen concerns a balloon material for medical balloon dilatation catheters made from blends of (1) a first crystalline polymer component, and (2) a second softening polymer component. The balloon material can also include (3) a third compatibilizing polymer component. While the Chen invention relates generally to polymer blends, Chen

discusses the invention in terms of preferred end uses in medical devices such as catheters and dilatation balloons. Chen, col. 1:9-22.

According to Chen, it was desirable to provide a polymeric blend for balloons for balloon dilatation catheters with a combination of the best features of the softer balloon materials and the stronger balloon materials, including good flexibility with (1) a thin, low profile, (2) high resistance to fatigue, (3) low compliance, and (4) high burst strength, with (5) a lower susceptibility to defects through mechanical handling, and (6) a lower susceptibility to pin-hole defects, compared with balloons made from PET. Chen, col. 2:30-38.

Difference between Claim 1 and Chen

Claim 1 requires a modifier [B] that includes at least a combination of both an organic acid (Item [2.1]) and an ionomer (Item [2.2]).

The essential difference between the subject matter of Claim 1 and the subject matter described by Chen is that Chen does not describe the use of a second softening polymer component that is a *combination* of (1) an organic acid with (2) an ionomer (Claim 1, Item [2.2]). Instead, Chen describes the use of the ionomer, *i.e.*, Chen's "second polymeric component". Chen, col. 2:54-55; col. 3:37-57; col. 5:40 to col. 6:44. *See also* Answer, page 19 (discussing the difference).

Wakabayashi 1, Wakabayashi 2 and Wakabayashi 3

To overcome the difference, the Examiner turned to Wakabayashi 1.

Wakabayashi 1 is an Abstract of a presentation that was to be made at a March 3-7, 2003 meeting of the American Physical Society. We do not know if the presentation occurred. An attempt by personnel at the Board to locate an underlying paper upon which the Abstract might have been based also was not

successful. As a result of that attempt, however, Wakabayashi 2 and Wakabayashi 3 came to our attention.

Based on all three Wakabayashi publications, we understand that Katsuyuki Wakabayashi (now Dr. Wakabayashi) was a graduate student at Princeton University in 2003 working under the direction of Dr. Richard A. Register. Dr. Register is a professor and polymer researcher at Princeton University. Based on the Wakabayashi publications, it appears that research which may have begun as early as 2003 (Wakabayashi 1) was probably completed in 2005-2006. Wakabayashi 2 and Wakabayashi 3 were published in 2006.

Applicant DuPont likely knew of the Wakabayashi/Register research. Wakabayashi 2, page 2875, col. 2 ("[t]he preparation of ionomer:metal soap blends was carried out at DuPont by melt mixing"); *id.* at 2883, col. 1; *see also* Wakabayashi 3, page 152. "Dupont Packaging and Industrial Polymers generously provided both financial support for this work and the materials studied herein. The authors are especially grateful to . . . [numerous individuals one of whom was] Dr. George Prejean of DuPont for providing all the materials employed herein, often on demand." Wakabayashi 2, page 2883, col. 1. *See also* Wakabayashi 3, page xv. DuPont provided copolymers for Wakabayashi's research. Wakabayashi 3, page 88; *see also* Wakabayashi 3, page 150. Melt index measurements were conducted at DuPont. Wakabayashi 3, page 160.

The Wakabayashi publications describe *blends* of magnesium aliphatic acid salts (magnesium stearate and magnesium oleate) with magnesium neutralized ethylene-alkyl acrylate-(meth)acrylic acid terpolymer ionomers. Wakabayashi 1 states that a magnesium neutralized ionomer and magnesium stearate coexist and that no phase separation was observed.

Wakabayashi 2 confirms a lack of separation when magnesium is used to neutralize the acid [—COOH] groups on both the stearic acid and the ionomer. Page 2878, col. 1 ["no tendency towards demixing was ever observed at any temperature"]; page 2882, col. 2. *See also* Wakabayashi 3, page 161. "While MgSt [magnesium stearate] remains intimately mixed (coassembled) with the ionomer upon cooling, NaSt [sodium stearate] phase-separates to give a composite consisting of domains of essentially pure ionomer and NaSt . . ." Wakabayashi 2, page 2882, col. 2. On the other hand, use of sodium for neutralization resulted in phase separation upon cooling forming relatively large and pure domains. Wakabayashi 2, page 2882, col. 2; *see also* Wakabayashi 3, page 181.

Wakabayashi 2 also notes the "obvious structural similarity between E/(M)AA ionomers and metal soaps, since they share both a common functional group (COO^-M^+) as well as long sequences of CH_2 units."[5] Paragraph bridging pages 2874-75. The term E/(M)AA means "ethylene (meth)acrylic acid". *See also* Wakabayashi 3, page 150.

Prima facie obviousness

The Examiner reasoned that one skilled in the art would have found it obvious to use the Wakabayashi 1 blend as the "second polymeric component" of Chen. Answer, pages 8-9.

The Chen component is described as being "a softening polymer" (col. 5:41), or as the Examiner accurately points out, a crystallinity-reducing component (Answer, page 9).

---

[5] The Wakabayashi research involved study of acids with chain lengths from C_{16} to C_{22}. Applicant has provided no objective evidence that "short" chain acids achieve applicant's objective. Claim 1 calls for an acid having 4-36 carbon atoms. Blend behavior is said to be quite sensitive to the acid (metal soap) selected. Wakabayashi 3, page 181.

Wakabayashi 2 indicates that typical E/(M)AA ionomers are semi-crystalline, with crystallinity depending on the content of acid comonomer. Page 2878, col. 1, first full paragraph, and page 2875, Table 1; *see also* Wakabayashi 3, pages 161-62.

The acid (also referred to as "soaps" or "metal soaps") in the Wakabayashi blends prevents formation of a percolated hard phase. Wakabayashi 3, page 166. A hard phase is something Chen seeks to avoid with respect to its softening second polymer component.

Applicant is using a known acid/ionomer blend (Wakabayashi 1, Wakabayashi 2 and Wakabayashi 3) consistent with a known purpose (Chen's second polymeric component) to achieve an expected result—a composition useful for Chen's purpose. Use of known materials for a known purpose is evidence of obviousness. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007) (combination of familiar elements according to known methods is likely to be obvious when it yields no more than predictable results).

Wakabayashi 2 provides a cogent analysis in support of its conclusion that use of magnesium vis-à-vis sodium to accomplish neutralization is desirable. Use of magnesium minimizes or eliminates phase separation and achieves other desirable properties relevant to Chen's softening second polymer component.

Applicant's arguments

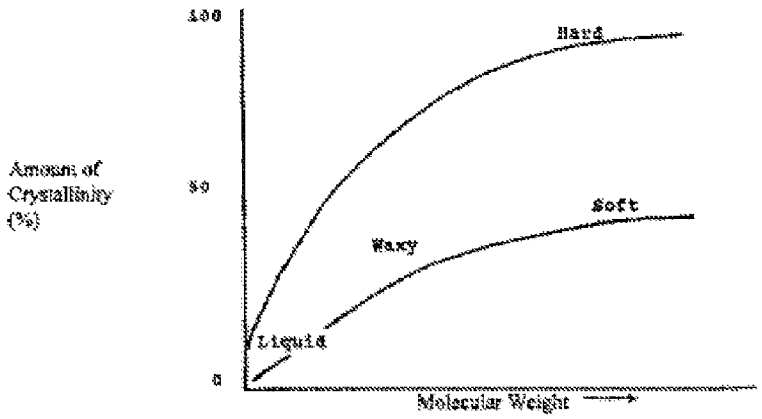
Chen's crystalline requirements

Applicant maintains that there would be no reason to use the Wakabayashi blends in the Chen combination because use of the blend would have been expected to destroy crystalline structures. Brief, page 12. However, some acid/ionomer blends have more crystalline ionomer than others. Wakabayashi 3, pages 181-82. Obviously, one skilled in the art seeking to minimize crystalline

content in Chen's softening second polymer component would have been inclined to use the Wakabayashi blends which do not increase crystalline content.

We also find that applicant appears to have overlooked the fact that any emphasis by Chen on crystalline structures relates to Chen's "first polymeric component". According to Chen, the first polymeric component is preferably a relatively strong crystalline polymer. Chen, col. 4:53. The Chen "second polymeric component" is added as a softening polymer. There is no reason why the Chen second polymeric component should need to maintain any *high degree* of crystallization given the purpose for which it is added to the overall Chen composition. Nor has applicant presented any credible evidence that use of the Chen second polymeric composition or the Wakabayashi blends alters in any negative manner the crystalline structure of Chen's first polymeric component.

The Examiner found that crystalline regions of a polymer contribute to strength, while amorphous regions (*i.e.*, non-crystalline regions) contribute to flexibility or softness. Answer, page 22. Fig. 2.26 of Carraher illustrates the general physical nature of materials as a function of the amount of crystallinity and molecular weight.



Carraher Fig. 2.26 depicts a graph of crystallinity v. molecular weight

Combination of Chen and Wakabayashi 1

According to applicant, Chen and Wakabayashi 1 are what is referred to in a § 103 context as "non-analogous" art. We will assume applicant would also maintain that Wakabayashi 2 and Wakabayashi 3 are non-analogous vis-à-vis Chen. If applicant is correct, then Chen cannot be combined with Wakabayashi 1, Wakabayashi 2 or Wakabayashi 3 to defeat Claim 1 under § 103.

The PTO and its reviewing courts have developed and applied a two-step "test" to determine whether a prior art reference is "analogous" art and therefore may be used as evidence with respect to a question of obviousness under § 103. *In re Wood*, 599 F.2d 1032 (CCPA 1979).

Step 1 requires an answer to the following question: "Is the reference within the field of the inventor's endeavor?" If the answer is "yes," then the reference is "analogous" and therefore may be used as evidence. *Id.* at 1036.

If the answer is "no", then Step 2 requires an answer to the following question: "Is the reference reasonably pertinent to the particular problem the inventor was trying to solve?" If the answer is "yes", then the reference is analogous and therefore may be used as evidence.[6] *Id.*

Wood explains that the rationale behind the two-step "test" is a "realization that an inventor could not possibly be aware of every teaching in every art." *Id.* The *Wood* rationale is consistent with earlier CCPA "non-analogous" art discussions. *See In re Antle*, 444 F.2d 1168, 1171-72 (CCPA 1971):

> As we also said in *Winslow*, [365 F.2d 1017, 1020 (CCPA 1966)] 'Section 103 requires us to presume full knowledge by the inventor of the prior art in the field of

[6] An example of a reference related to solving an inventor's mechanical closure problem is the Livingston patent discussed in connection with the Scroggins patent before the Court in *Graham v. John Deere Co.*, 383 U.S. 1, 35 (1966).

> his endeavor', but it does not require us to presume full knowledge by the inventor of prior art outside the field of his endeavor, i.e., of 'non-analogous' art. In that respect, it only requires us to presume that the inventor would have that ability to select and utilize knowledge from other arts reasonably pertinent to his particular problem which would be expected of a man of ordinary skill in the art to which the subject matter pertains.

Wood and similar earlier precedent seems to have approached the "non-analogous" art issue from a perspective of an inventor. Notwithstanding *Wood* and similar precedent, and as will become apparent, a "no" answer to both Step 1 and Step 2 does not always compel a decision that a reference is non-analogous and therefore may not be used as a reference in a § 103 context.[7] Since *Wood*, § 103 obviousness considerations have not been restricted to an analysis based solely from an inventor's point of view. Rather, § 103 analysis focuses on what is claimed apart from the motivation of the inventor. *In re Dillon*, 919 F.2d 688 (Fed. Cir. 1990) (*en banc*), is illustrative.

Dillon involved the patentability under § 103 of claims directed to a composition comprising (1) fuel and (2) a particular tetra-orthoester. Inventor Dillon discovered that use of the tetra-orthoester in fuel *reduced particulate emissions when the fuel was burned*. However, use of the tri- and tetra-orthoesters in fuel to *minimize or eliminate water freezing in fuel transportation pipelines valves* in cold weather was taught by a prior art Elliott patent. Preventing water freezing in valves in fuel pipeline transportation systems in cold weather regions of the United States was not a problem which inventor Dillon was trying to solve. Tetra-orthoester prior art did not describe its use in fuel as a means for reducing

[7] Whether future development of the law results in creation of a Step 3 is a matter we (1) do not foreclose and (2) leave for another day.

particulate emissions. However, as *Dillon* notes:

> Howk teaches use of both tri- and tetra-orthoesters in a similar type of chemical reaction. Elliott teaches their equivalence *for a particular practical use* [*i.e.*, prevention of water freezing].

Id. at 692.

> The issue before . . . [the *Dillon*] court . . . [was] whether the Board erred in rejecting as obvious under 35 U.S.C. § 103 claims to Dillon's new compositions and to the new method of reducing particulate emissions, when the additives in the new compositions are structurally similar to additives in known compositions, having a different use, but the new method of reducing particulate emissions is neither taught nor suggested by the prior art.

Id. at 691.

Dillon held that the claimed compositions would have been obvious notwithstanding the different utility discovered by inventor Dillon and that disclosed in the orthoester prior art. *Dillon* notes that:

> it is not necessary in order to establish a *prima facie* case of obviousness that . . . there be a suggestion in or expectation from *the prior art* that the claimed compound or composition will have the same or a similar utility *as one newly discovered by applicant*.

Id. at 693 (emphasis in original).

Subsequent precedent continues *Dillon's* approach. *See, e.g., In re Kemps*, 97 F.3d 1427, 1430 (Fed. Cir. 1996) ("Although the motivation to combine here differs from that of the applicant, the motivation in the prior art to combine the references does not have to be identical to that of the applicant to establish obviousness.").

In *KSR*, the Supreme Court understood the court below to have held in a § 103 context that "unless the 'prior art references address[ed] the precise problem

that the patent was trying to solve,' the problem would not motivate an inventor to look into those references." 550 U.S. at 414. However, the Court observed that (italics added):

> In determining whether the subject matter of a . . . claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim. If the claim extends to what is obvious, it is . . . [unpatentable] under § 103. One of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of the invention a known problem for which there was an obvious solution *encompassed by the patent's claims*.

Id. at 419-20.

The Court's observation is consistent with *Dillon* and *Kemps*. The reason for declining to allow a claim for subject matter that would have been obvious under § 103 is based on the proposition that such allowance withdraws from the public domain subject matter that those skilled in the art should be free to use. *Graham v. John Deere Co.*, 383 U.S. at 6 (patents that remove existent knowledge from the public domain or to restrict free access to materials already available should not be issued); *see also In re Kubin*, 561 F.3d 1351, 1358 (Fed. Cir. 2009) ("[a] patent on such a structure would remove from the public that which is in the public domain by virtue of its inclusion in, or obviousness from, the prior art"); *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007) ("obvious variants of prior art references are themselves part of the public domain").

It may be true that Chen and applicant set out to solve different problems. However, those practicing the Chen invention should be free to make a modification to that invention by including in the Chen composition the blends described by the Wakabayashi publications. Allowance of Claim 1 on appeal on the record before us would preclude those skilled in the art from practicing an

obvious modification of Chen's invention. As *KSR* notes, § 103 is designed to prevent that from happening.

When a *Wood* analogous art analysis is made from the point of view of combining the Chen patent and the Wakabayashi publications, it then becomes manifest that the Wakabayashi publications are related to Chen's field of endeavor. On that basis, the patent and publications can be combined to determine whether Claim 1 on appeal is unpatentable under § 103. We agree with the Examiner's observation (Answer, page 21):

> the fact that Wakabayashi [1] is not concerned with . . . [applicant's] field of endeavor (ostensibly the manufacture of shaped articles from PTT compositions) and solves a problem other than that identified by . . . [applicant] does not preclude the use of . . . [Wakabayashi 1] in a proper rejection under 35 USC [§] 103(a).

For the reasons given, we reject applicant's argument that Chen and the Wakabayashi publications are non-analogous art which cannot be used to support a § 103 rejection.

Magnesium neutralized ionomer

Applicant maintains that Chen does not describe the use of magnesium neutralized ionomers. Brief, page 10. In initially describing its second polymeric ionomer component, Chen explicitly describes neutralization with sodium, potassium, zinc, lithium calcium and ammonium ions. Col. 3:56-57. However, in subsequent discussion Chen includes magnesium ions. Col. 6:43. Wakabayashi 2 sets out the reasons for neutralizing both the acid and ionomer with magnesium. A mixture of an acid neutralized with magnesium ions and an ionomer neutralized with sodium ions separates. Page 2882, col. 2. Separation is not a desirable

property. One skilled in the art would have recognized the benefit of using a blend of magnesium neutralized materials.

Detrimental effect of use of acids neutralized with sodium

Applicant maintains that the use of sodium neutralized carboxylic acid failed to reduce viscosity. Brief, page 8. Wakabayashi 2 reveals why. One skilled in the art would have used magnesium neutralized vis-à-vis sodium neutralized acid salts in a Chen composition. Sodium neutralized acids tend to phase separate when blended with the ionomer. Wakabayashi, page 2882, col. 2.

Unexpected results

We, like the Examiner, believe that applicant maintains that it has discovered a new and unexpected result, *viz.*, an ability to reduce PTT (3GP) viscosity while maintaining PTT molecular weight. Brief, page 6; Answer, page 18 ("[a]though not expressly stated, it is believed that . . . [applicant] wishes to establish evidence for unexpected results based on . . . data [in Tables A and B (Brief, pages 7 and 10)] and . . . subsequent discussion of [those] results.").

Relying on experimental data from the Specification, applicant says that its unexpected result is achieved when magnesium acid salts, and not sodium acid salts, are blended with the ionomer. Brief, page 6.

A showing of unexpected results generally must be commensurate in scope with a claimed range. *In re Harris*, 409 F.3d 1339, 1344 (Fed. Cir. 2005) ("[T]he record does not show that the improved performance would result if the weight-percentages were varied within the claimed ranges. Even assuming that the results were unexpected, Harris needed to show results covering the scope of the claimed range.").

Based on data set out in Tables A and B[8] (Brief, page 7), it may be possible under certain circumstances to achieve applicant's viscosity/molecular weight desired result.

For a variety of reasons, the Examiner declined to give controlling weight to, i.e., declined to credit, applicant's proffered evidence of unexpected results.

The Examiner found that the experimental data is not commensurate in scope with the breadth of the claims. The Examiner's findings are made apparent from a "table" on page 19 of the Answer as follows.

Component	Claim 1		Experimental Results	
Polyester composition	poly(trimethylene terephthalate) OR poly(tetramethylene terephthalate	70-99.6%	Only poly(trimethylene terephthalate)	80-99%
Aliphatic, monofunctional organic acid	organic acid with 4-36 carbon atoms, optionally substituted with a C1-8 alkyl group	amount not specified	Only magnesium stearate, sodium stearate, or sodium behenate	30% or 40%, based on blend with ionomer
Ionomer derived from an ethylene acid copolymer	copolymerized comonomers of ethylene, at least one C3-8 unsaturated carboxylic acid, and optionally a C3-8 unsaturated carboxylic acid ester; 75-100% neutralized	amount not specified	Only copolymers of ethylene, acrylic or methacrylic acid, and n-butyl acrylate (a C4 unsaturated carboxylic acid ester); 100% neutralized	60% or 70%, based on blend with acid
Ethylene ester copolymer	20-95% ethylene; 0-25% glycidyl acrylate or methacrylate; 0-80% C1-C8 unsaturated carboxylic acid ester	amount not specified	Only EMA-1, comprising 70% ethylene/30% methyl acrylate, or EBAGMA-1, containing 70% ethylene/25% n-butyl acrylate/5% glycidyl methacrylate	5% or 10%, based on total blend amount

The Examiner found that applicant tested PTT as a polyester composition. Claim 1 covers the use of both PTT and PTB. Answer, page 19. No PTB testing is reported. The Examiner also found that applicant's testing related "only [to] a very narrow range of compounds falling within the . . . [Claim 1] genus for the remaining components." *Id.* Applicant did not file a Reply Brief responsive to the Examiner's findings as set out in the Answer.

[8] The data in Tables A and B are said to be based on experimental work reported in the Specification. We assume that the data are based on actual experimentation and that the Specification's examples are not prophetic.

The Examiner's analysis is consistent with observations made in Wakabayashi 2. Discussing blends with different carboxylic acid salts (MgSt—magnesium stearate), (MgOl—magnesium oleate and MgEt—magnesium erucate), and results set out in Fig. 11, Wakabayashi 2 found that only magnesium stearate crystallizes to reinforce compositions. Page 2862, col. 1. The metal cation used has a substantial impact on phase separation. Wakabayashi 3, page 181. Applicant has not established that the result can be achieved with zinc and calcium cations. Blend behavior is also said to be "quite sensitive to the metal soap chosen". *Id.* There is no objective evidence that "short" chain acid will achieve applicant's results. *See* n.5, *supra*.

The Examiner also observed, correctly, that reduced viscosity while maintaining molecular weight is not recited in the claims. Answer, page 20. The Examiner declined, again correctly, to read a viscosity or molecular weight limitation into Claim 1. Accordingly, it is apparent that Claim 1 is not explicitly limited to compositions having the alleged unexpected result. When an applicant alleges an *unclaimed* unexpected result, the burden of establishing results commensurate in scope with a claim may be difficult. On the other hand, when the unexpected result (*e.g.*, a particular property) is claimed, then applicant's burden is simplified because the applicant can then focus on establishing that the prior art relied upon by an examiner does not achieve the result, or to use the words of *McClain*, the new function. Applicant in this case elected not to claim the result and therefore labored under a burden to establish unexpected results commensurate in scope with the breadth of Claim 1.

On the record before us, we have no basis for disagreeing with weight the Examiner assigned to applicant's unexpected result evidence. *In re Am. Acad of Sci. Tech Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004) (Board has broad discretion as

to the weight given to five declarations offered in the course of prosecution); *In re NTP, Inc.*, 654 F.3d 1268, 1275 (Fed. Cir. 2011) (Board has discretion as to the weight to give declarations).

For the reasons given, we find that applicant has not established that the subject matter of Claim 1 possesses unexpected properties commensurate in scope with the breadth of the claim.

Other arguments

We have considered applicant's remaining arguments and find none that warrant reversal of the Examiner's rejections. *Cf. In re Antor Media Corp.*, 689 F.3d 1282, 1294 (Fed. Cir. 2012).

Decision

Upon consideration of the appeal, and for the reasons given herein, it is

ORDERED that the decision of the Examiner rejecting the claims on appeal under § 103 over the prior art is *affirmed.*

FURTHER ORDERED that since we have relied on Wakabayashi 2 and Wakabayashi 3, and perhaps have advanced new rationale in support of obviousness, our affirmance is designated as a new rejection. 37 C.F.R. § 41.50(b).

FURTHER ORDERED that our decision is not a final agency action.

FURTHER ORDERED that within **two (2) months** from the date of our decision, appellant may further prosecute the application on appeal by exercising one of the two following options:

Option 1: Request that prosecution be reopened by submitting an amendment or evidence or both. 37 C.F.R. § 41.50(b)(1).

Option 2: Request rehearing on the record presently before the Board. 37 C.F.R. § 41.50(b)(2).

FURTHER ORDERED that no time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

bar