



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.
11/208,974	08/22/2005	YuanQiao Rao	063539	1196
38834	7590	02/04/2013	EXAMINER	
WESTERMAN, HATTORI, DANIELS & ADRIAN, I.L.P. 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			KHATRI, PRASHANT J	
			ART UNIT	PAPER NUMBER
			1783	
			NOTIFICATION DATE	DELIVERY MODE
			02/04/2013	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):

patentmail@whda.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YUANQIAO RAO, JANGLIN
CHEN, and TOMOHIRO ISHIKAWA

Appeal 2011-010436
Application 11/208,974
Technology Center 1700

Before KAREN M. HASTINGS, GEORGE C. BEST, and
GRACE KARAFFA OBERMANN, *Administrative Patent Judges*.

OBERMANN, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants seek relief under 35 U.S.C. § 134 from the final rejection of claims 1-2, 4-15, and 18-30 directed to a nanocomposite film. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

STATEMENT OF THE CASE

Claim 1 is illustrative of the subject matter on appeal:

1. A nanocomposite film comprising nanoparticles dispersed in a polymer matrix comprising at least one polymer, wherein the nanoparticles have been generated in situ in the polymer matrix, and wherein said film simultaneously satisfies the following three conditions:

$$|\Delta n_{th}(\lambda_2)| - |\Delta n_{th}(\lambda_1)| > 0 \text{ for } 400 \text{ nm} < \lambda_1 < \lambda_2 < 650 \text{ nm} \quad (\text{i})$$

$$|n_x - n_y| < 0.0001 \quad (\text{ii})$$

$$\Delta n_{th}(450 \text{ nm}) / \Delta n_{th}(550 \text{ nm}) < 0.98 \quad (\text{iii}).^1$$

App. Br. 13 (Claims App'x).

THE REJECTIONS

Appellants seek our review of the following rejections:

1. Claims 1-2, 4-9, 11, 12, 18-20, 22-25, and 30 under 35 U.S.C. § 103(a) as unpatentable over Lee *et al.*, *High-Refractive-Index Thin Films Prepared from Trialkoxysilane-Capped Poly(methylmethacrylate)-Titania Materials*, 13 CHEM. MATERIALS 1137-42 (2001) (hereinafter "Lee") with evidence provided by Chen *et al.*, *Synthesis and Characterization of Trialkoxysilane-Capped Poly(methyl methacrylate)-Titania Hybrid Optical Thin Films*, 9 J. MATERIALS CHEM. 9, 2999-3003 (1999) (hereinafter "Chen"); and Philipse, A. *Particulate Colloids: Aspects of Preparation and Characterization*, 4 FUNDAMENTALS OF INTERFACE & COLLOID SCI. 2.1-2.71 (2005) (hereinafter "Philipse").

¹ The Specification (5:21) states the second condition as $|n_x - n_y| < 0.0001$. In the event of further prosecution, claim 1 should be corrected to reflect the subscripts as supported by the Specification.

2. Claims 1-2, 4-7, 11-12, 14-15, 19-20, 22, and 24-25 under 35 U.S.C. § 103(a) as unpatentable over Uchiyama et al. (US 6,565,974 B1 issued May 20, 2003) (hereinafter “Uchiyama”) in view of Lee with evidence provided by Chen and Philipse.

3. Claims 1-2, 4-7, 13, 18, 21-23, and 26-30 under 35 U.S.C. § 103(a) as unpatentable over Okubo et al. (US 2004/0044127 A1 published Mar. 4, 2004) (hereinafter “Okubo”) in view of Lee with evidence provided by Chen and Philipse.

ANALYSIS

Appellants’ arguments focus exclusively on the limitations of claim 1 and address the three standing rejections together. App. Br. 4. Our analysis of the patentability of claim 1 over Lee in view of Chen and Philipse is dispositive of all issues raised in this appeal. *Id.*

Claim 1 is directed to a nanocomposite film useful for improving contrast in a liquid crystal display (LCD). Birefringence dispersion is a property of compensation films that is used to improve image quality of an LCD. A material that displays at least two different indices of refraction is birefringent. Spec. 1:17-30. Indices of refraction are functions of wavelength (λ). Out-of-plane birefringence (Δn_{th}) depends on wavelength (λ), a dependence known as birefringence dispersion. It is desirable for the absolute value of out-of-plane birefringence (Δn_{th}) to increase at longer wavelength (λ), a behavior called reverse dispersion. *Id.* at 2:2-5, 28-30.

The nanocomposite film of claim 1 comprises an organic-inorganic hybrid material developed by a sol-gel technique wherein metal oxide nanoparticles are formed in situ. *Id.* at 1:5-7; 11:10-26. Suitable polymers include poly(methylmethacrylate). *Id.* at 28:19-20. Suitable metal oxides

include titanium-n-butoxide. *Id.* at 21:1-3. The inventive film comprises metal oxide dispersed in a polymer matrix wherein the film satisfies three conditions (stated in claim 1 as (i), (ii), and (iii)) for obtaining reverse dispersion behavior in an optical film. *Id.* at 5:8-25.

Lee discloses an organic-inorganic hybrid material developed by a sol-gel technique wherein metal oxide nanoparticles are formed in situ. Lee 1137 (abstract); 1137-38 and n.16 (disclosing organic-inorganic hybrid optical thin films “prepared . . . by the sol-gel technique” disclosed in Chen); Chen 2999-3000 (describing preparation of hybrid polymer films and titania film). Suitable polymers include poly(methylmethacrylate). *Id.* Suitable metal oxides include titanium-n-butoxide. *Id.*

On this record, we agree with the Examiner that the organic-inorganic hybrid materials encompassed by Lee and claim 1 appear to be substantially identical or produced by substantially identical sol-gel methods. Ans. 4, 16. The Examiner thus has established a prima facie showing that Lee’s material inherently possesses the characteristics of the claimed material, including the three conditions stated in claim 1 for obtaining reverse dispersion behavior in an optical film. *See In re Best*, 562 F.2d 1252, 1255 (CCPA 1977) (where “the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product.”).

The question remains whether Appellants have come forward with evidence sufficient to overcome that prima facie showing. Appellants rely on the Yoshimi Declaration (executed under 37 C.F.R. § 1.132 on Mar. 19, 2009). Appellants contend that Lee discloses that higher titania contents

result in a lower Abbe Number, which is indicative of higher dispersion. Yoshimi Decl. 6.3-6.4. Appellants recognize that “Lee does not directly disclose the dispersion of birefringence,” but contend that a skilled artisan would have known “that higher dispersion of reflective [*sic*, refractive] index tends to show higher dispersion of birefringence.” *Id.* at 6.4.

Appellants point out that “the pending invention provides lower dispersion of birefringence,” for example, reverse dispersion in claim 1. *Id.* at 6.6. On that basis, Appellants contend that “what is taught and suggested by Lee is opposite to the result of the pending claims.” *Id.* at 6.7.

Appellants miss the mark by contending that “a skilled artisan cannot expect a reverse dispersion . . . by adding TiO₂ at any concentration because Lee teaches that the addition results in higher dispersion.” App. Br. 6. We agree with the Examiner that the fact that the applied art does not recognize the three conditions set forth in claim 1 is irrelevant because the rejection is based upon an inherent rather than an explicit disclosure. Ans. 16 (“claiming of a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable”); *see also In re Kubin*, 561 F.2d 1351, 1357 (Fed. Cir. 2009) (“[e]ven if no prior art of record explicitly discusses the [limitation], [applicant's] application itself instructs that [the limitation] is not an additional requirement imposed by the claims on the [claimed invention], but rather a property necessarily present in [the claimed invention]”); *King Pharms., Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1275-76 (Fed. Cir. 2010) (stating that “merely discovering and claiming a new benefit of an old process cannot render the process again patentable” (citations omitted)).

Appellants' other arguments are unconvincing. The Examiner finds "that the refractive index as measured by Lee and Chen are not equivalent to the presently claimed out-of-plane birefringence which Appellant[s] assert[] is measured by Lee and Chen." Ans. 15. That finding stands unchallenged by Appellants. *See* Reply Br. 1-3.

The Examiner further finds that the data contained in the Yoshimi Declaration "is not commensurate in scope with the claims and the references of Lee and Chen" because none of the data reflects "concentrations below 50% and particularly those shown at lower concentrations by Lee and Chen." Ans. 14-15. The evidence of record supports that finding, where the examples set forth in the Specification employ a weight ratio of metal oxide to organic polymer of 50 to 50 or less, and Lee discloses a film wherein that weight ratio is 40 to 60. *See, e.g.*, Lee 1138 (Table 1 and experimental section, reflecting hybrid thin film T40); Spec. 37:15 (example 1, weight ratio of metal oxide to organic polymer "is 10 to 90"); 38:15 (example 2, weight ratio "is 50 to 50"); 39:10 (example 3, weight ratio "is 30 to 70"); 40:8 (example 4, weight ratio "was 5:95"); 40:21 (example 5, weight ratio "was 5:95"). Appellants' evidence thus focuses on embodiments set forth in Lee that are not the closest prior art. Yoshimi Decl. 6.5 ("Lee teaches that addition of TiO₂ leads to higher dispersion not only in higher TiO₂ content (T90, for example) but also in the content of not more than 70 %").

Appellants have not established that the film disclosed in Lee (for example, hybrid film T40, *see* Lee 1138) differs in any meaningful way from a film prepared according to claim 1 (for example, films prepared in examples 1-5, wherein the weight ratio of metal oxide to organic polymer

ranges from 5:95 to 50:50, *see* Spec. 37:15; 38:15; 39:10; 40:8; 40:21). On this record, Appellants' evidence does not speak to whether the closest prior art film inherently possesses the characteristics of the inventive film (including the three conditions set forth in claim 1). Ans. 16.

Therefore, we are of the opinion that Appellants' evidence is insufficient to overcome the *prima facie* showing of obviousness made by the Examiner. The applied art renders obvious the nanocomposite film of claim 1, and the three conditions set forth in claim 1 represent inherent characteristics of the prior art film that add nothing of patentable consequence. *Cf. In re Kao*, 639 F.3d 1057, 1070 (Fed. Cir. 2011).

No persuasive argument or evidence having been brought forward by Appellants, we affirm the rejections of claims 1-2, 4-15, and 18-30.

CONCLUSION

For the above reasons, we affirm the rejections of claims 1-2, 4-15, and 18-30.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136.

AFFIRMED

cam