

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* SHIGEO FUJII, HIROYUKI YOSHIDA,  
TOSHIYA HAGIHARA and HIROAKI KITAYAMA

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Appeal 2008-1732  
Application 10/175,884  
Technology Center 1700

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Decided: March 28, 2008

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Before BRADLEY R. GARRIS, ROMULO H. DELMENDO, and  
JEFFREY T. SMITH, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 (2002) from a final rejection of claims 1, 5, 7, and 15-23. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

Appellants state they invented a polishing composition having “an index of degree of sedimentation<sup>[1]</sup> of 80 or more and 100 or less,” the composition comprising an abrasive and water. (Spec. 4, ll. 5-8). According to Appellants, “[s]ince the polishing composition has such a high index of degree of sedimentation, there can be exhibited remarkable effects such that the clogging of the polishing pad can be significantly reduced, so that the stable production of polished object can be maintained.” (Spec. 4, ll. 10-13).

Claims 1 and 23 on appeal read as follows:

1. A polishing composition comprising  
water,

an abrasive comprising both  $\alpha$ -alumina and also intermediate alumina particles selected from the group consisting of  $\gamma$ -alumina particles,  $\delta$ -alumina particles,  $\theta$ -alumina particles,  $\eta$ -alumina particles, and  $\kappa$ -alumina particles, wherein the content of the intermediate alumina in the abrasive is from 4 to 40 parts by weight based on 100 parts by weight of the abrasive excluding the intermediate alumina, and

a clogging preventive compound selected from the group consisting of compounds that dissolve nickel hydroxide at a pH of 8.0, selected from the group consisting of  $\alpha$ -amino acids having 2 to 3 carbon atoms and enolic organic acids having 3 to 10 carbon atoms,

wherein the polishing composition has an index of degree of sedimentation of 80 or more and 100 or less.

23. The polishing composition according to claim 1,  
wherein the abrasive consists essentially of  $\alpha$ -alumina particles

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<sup>[1]</sup> According to Appellants, “[t]he index of degree of sedimentation is an index showing the extent of unlikelihood for the polishing composition of causing clogging in the polishing pad.” (Spec. 4, ll. 18-20). The Specification describes the procedure for the determination of the index in further detail at page 5, line 6 to page 6, line 25.

and intermediate alumina particles selected from the group consisting of  $\gamma$ -alumina particles,  $\delta$ -alumina particles,  $\theta$ -alumina particles,  $\eta$ -alumina particles, and  $\kappa$ -alumina particles.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Wake <sup>2</sup>	2002/0037642 A1	Mar. 28, 2002
Taira <sup>3</sup>	WO00/32712	Jun. 8, 2000

The Examiner rejected claims 1, 5, 7, and 15-23 under 35 U.S.C. § 103(a) as unpatentable over Wake alone or Wake in view of WO 00332712.

## ISSUES

Have Appellants shown error in the Examiner's determination that the claimed subject matter would have been obvious over the applied prior art within the meaning of 35 U.S.C. § 103(a)?

## FINDINGS OF FACT

1. With respect to the clogging preventive compound, the present Specification contains the following description:

Another preferable clogging preventive is a compound capable of dissolving nickel hydroxide at a pH of 8.0 (25°C)...Examples of the compound include citric acid,  $\alpha$ -amino acids having 2 to 3 carbon atoms, and

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<sup>2</sup> Wake was published on March 28, 2002 based on United States Application 09/741,131 filed on December 19, 2000.

<sup>3</sup> Appellants do not contest the Examiner's citation of United States Patent 6,569,216 B1 issued to Taira on May 27, 2003 as an English language translation of WO00/32712. (Ans. 4). Nevertheless, the Examiner subsequently entered into the record an English language translation of WO00/32712 on September 4, 2007.

enolic organic acids having 3 to 10 carbon atoms. Among them, from the viewpoint of increase in the dissolution of nickel hydroxide and from the viewpoint of the clogging prevention, glycine, ascorbic acid and citric acid are preferable, *glycine and citric acid are more preferable, and citric acid is most preferable.* [Emphasis added.]

2. Wake describes a chemical mechanical polishing (CMP) slurry (i.e., a polishing composition) that prevents adhesion of a polishing product to a polishing pad and forms a uniform interconnect layer with an improved throughput, even when polishing a large amount of copper-containing metal during a polishing step. (¶0027, 0033).
3. Wake teaches that the slurry comprises a polishing material, an oxidizing agent, an organic acid, and water. (¶0038).
4. Wake further teaches that “the slurry comprises citric acid to be an adhesion inhibitor as an organic acid or θ-alumina mainly containing secondary particles made of aggregated primary particles (secondary-particle containing θ-alumina) as a polishing material.” (¶0038).
5. Wake also discloses that “[a]s long as it does not adversely affect the effects of the secondary-particle containing θ-alumina, additional polishing grains may be used, which includes aluminas such as α-alumina and δ-alumina other than θ-alumina” (¶0063) and, when citric acid is used, the “polishing material may be, instead of the above secondary-particle containing θ-alumina, aluminas such as commonly used α-alumina, θ-alumina and δ-alumina; silicas such as fumed

silica and colloidal silica; titania; zirconia; germania; ceria; and a combination of two or more selected from these metal oxide polishing grains” (¶0063).

6. Wake teaches that although citric acid acts as a proton donor for enhancing oxidization by the oxidizing agent and achieving stable polishing, “a different organic acid such as a carboxylic acid and an amino acid may be added,” one of which is identified as glycine. (¶0070).
7. In Table 1, Wake discloses working examples (Nos. 1 and 4-10) of aqueous polishing slurries containing, *inter alia*  $\theta$ -alumina and an organic acid component of glycine (or glycine, citric acid, and glutaric acid). (¶¶0098-0110).
8. According to Wake, “[i]n CMP using a polishing slurry comprising citric acid, adhesion of a polishing product to the polishing pad was little observed and a polishing rate was stable and constant until termination of polishing,” while “[o]n the other hand, in CMP using a polishing slurry comprising not citric acid but a carboxylic acid (glutaric acid) or an amino acid (glycine), a large amount of polishing product was adhered to the polishing pad...” (¶0102).
9. The polishing compositions described in Wake’s working examples do not contain  $\alpha$ -alumina as recited in appealed claim 1.
10. Wake does not discuss index of degree of sedimentation.
11. Appellants do not contest the Examiner’s finding that WO00/32712 teaches the use of a mixture of an abrasive ( $\alpha$ -

alumina) and intermediate alumina ( $\theta$ -alumina) in a polishing composition, wherein the content of the intermediate alumina ( $\theta$ -alumina) is 1-50 parts per 100 parts of the abrasive. (Ans. 4-5).

12. The Examiner found that WO00/32712 “clearly shows that  $\alpha$  alumina, when used in a major amount, does not adversely affect the effects of the  $\theta$  alumina...” (Ans. 6).
13. Appellants do not rely on any evidence of unexpected results (e.g., a showing that the claimed composition containing “ $\alpha$ -amino acids having 2 to 3 carbon atoms and enolic organic acids having 3 to 10 carbon atoms” provides unexpected results relative to a composition containing glycine as in Wake’s working examples, Nos. 1 and 4-10).

#### PRINCIPLES OF LAW

“Section 103 forbids issuance of a patent when the ‘differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains.’” *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007).

#### ANALYSIS

In the Appeal Brief, claim 23 is the only claim argued separately from the other appealed claims (claims 1, 5, 7, and 15-22). Accordingly, we confine our discussion of the Examiner’s rejection to claims 1 and 23. 37 C.F.R. § 41.37(c)(vii).

The Examiner's basic position is that Wake teaches polishing compositions that may comprise water, glycine, and a mixture of  $\alpha$ -alumina and  $\theta$ -alumina in relative weight proportions within the Appellants' claimed range and, therefore, the subject matter of appealed claim 1 or 23 would have been *prima facie* obvious to a person having ordinary skill in the art. (Ans. 9). As to the index of degree of sedimentation, the Examiner held that "this feature (characteristic) is expected in the [Wake] reference composition because it is a function of the composition..." (Ans. 5).

Appellants, on the other hand, contend that *In re Baird*, 16 F.3d 380 (Fed. Cir. 1994) is controlling because the Examiner "picks and chooses from amongst the various generic disclosures in the references, selecting out therefrom various *individual elements...*" (App. Br. 5). Appellants further argue that "Wake teaches away from the use of glycine..." (App. Br. 6).

We cannot agree with Appellants. While the compositions of Wake's examples (Table 1, Nos. 4-10) do not contain  $\alpha$ -alumina (Fact 9), one of ordinary skill in the art would have found it *prima facie* obvious to use a mixture of  $\alpha$ -alumina and  $\theta$ -alumina in suitable relative weight ratios as the polishing grain in lieu of  $\theta$ -alumina alone in view of Wake's express teachings that such an alumina mixture would provide successful results. (Fact 5).

As for the claimed relative amounts of the two types of alumina materials, the determination of workable or optimum ratios of  $\alpha$ -alumina to  $\theta$ -alumina would have been within the level of the ordinary skill. *In re Peterson*, 315 F.3d 1325, 1330 (Fed. Cir. 2003)(“The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage

ranges is the optimum combination of percentages.”); *In re Aller*, 220 F.2d 454, 456 (CCPA 1955)(“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”).

The teachings of WO00/32712 provide additional support for the Examiner’s position regarding the claimed amounts of the alumina materials. As pointed out by the Examiner (Ans. 9-10), Wake teaches that a mixture of different alumina materials may be used provided that it does not adversely affect the effects of the secondary-particle containing  $\theta$ -alumina. Fact 5. The Examiner found, and Appellants do not dispute, that WO00/32712 provides evidence that the claimed relative amounts of the alumina materials did not adversely affect the function of  $\theta$ -alumina, as required by Wake. Thus, a person having ordinary skill in the art would have been led to use a mixture of  $\alpha$ -alumina and  $\theta$ -alumina in amounts as recited in appealed claim 1 or claim 23.

Upon formulating a polishing composition in accordance with the teachings of the prior art, the index of degree of sedimentation would necessarily follow. *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. App. & Int. 1985)(holding that the recognition of a result flowing naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious).

Appellants’ reliance on *In re Baird* is misplaced. Appellants have not demonstrated any similarities in the facts that would compel a ruling based on the application of *Baird*. Here, the claimed composition differs from the closest prior art (Wake’s exemplified compositions) only in terms of the additional presence of  $\alpha$ -alumina. (Fact 9). But Wake expressly teaches that

another alumina (e.g.,  $\alpha$ -alumina) may be used in combination with  $\theta$ -alumina. (Fact 5).

Appellants argue that Wake teaches away from using glycine. (App. Br. 6). This argument has no merit. Wake teaches that compositions containing citric acid alone (No. 3) or a combination of citric acid, glutaric acid, and glycine (Nos. 4-10) provide superior results (in terms of adhesion of a polishing product to the polishing pad) relative to a composition that does not contain citric acid (Nos. 1 and 2). (Fact 8). If anything, Wake's teachings with respect to citric acid are consistent with Appellants' own Specification, which touts the superiority of citric acid relative to other organic acids. (Fact 1). Regardless, Wake actually encourages the use of a composition containing, *inter alia*, glycine. In this regard, appealed claim 1 recites the transitional term "comprising," thus leaving the claim open to unrecited components such as glutaric acid and citric acid. *In re Baxter*, 656 F.2d 679, 686 (CCPA 1981).

## CONCLUSION

On this record, we determine that Appellants have not demonstrated any error in the Examiner's obviousness conclusion.

## DECISION

The Examiner's rejection under 35 U.S.C. § 103(a) of claims 1, 5, 7, and 15-23 as unpatentable over the applied prior art is affirmed.

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).

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AFFIRMED

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