

The opinion in support of the decision being entered today
is *not* binding precedent of the Board

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte OLIVER DERNOVSEK,
MARKUS EBERSTEIN, WOLFGANG GUTHER, CHRISTINA MODES,
GABRIELE PREU, WOLFGANG ARNO SCHILLER,
BARBEL SCHULZ, and WOLFRAM WERSING

Appeal 2007-1940
Application 10/362,942
Technology Center 1700

Decided: August 30, 2007

Before BRADLEY R. GARRIS, CHARLES F. WARREN, and
CATHERINE Q. TIMM, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

DECISION ON APPEAL

Applicants appeal to the Board from the decision of the Primary Examiner finally rejecting claims 21 through 36 and 38 through 40 in the Office Action mailed April 3, 2006. 35 U.S.C. §§ 6 and 134(a) (2002); 37 C.F.R. § 41.31(a) (2006).

We affirm the decision of the Primary Examiner.

Claims 21 and 23 illustrate Appellants' invention of a glass ceramic mass, and are representative of the claims on appeal:

21. Glass ceramic mass comprising:

at least one oxide ceramic, containing barium, titanium and at least one rare earth metal Rek, and

at least one glass material, containing at least one oxide of boron, at least one oxide of at least one tetravalent metal Me⁴⁺ selected from the group consisting of titanium, zirconium and hafnium, and at least one oxide of at least one rare earth metal Reg,

said glass ceramic mass having:

a permittivity which is selected from the range between 15 inclusive and 80 inclusive,

a quality which is selected from the range between 300 inclusive and 5000 inclusive, and

a Tf value which is selected from the range between -20 ppm/K inclusive and +20 ppm/K inclusive.

23. Glass ceramic mass comprising:

at least one oxide ceramic, containing barium, titanium and at least one rare earth metal Rek, and

at least one glass material, containing at least one oxide of boron, at least one oxide of at least one rare earth metal Reg, and

at least one oxide of at least one pentavalent metal M⁵⁺ selected from the group consisting of vanadium, niobium and tantalum,

said glass ceramic mass having:

a permittivity which is selected from the range between 15 inclusive and 80 inclusive,

a quality which is selected from the range between 300 inclusive and 5000 inclusive, and

a Tf value which is selected from the range between -20 ppm/K inclusive and +20 ppm/K inclusive.

The Examiner relies on the evidence in this reference:

Suzuki¹ JP 07-272537 A Oct. 20, 1995

Appellants request review of the grounds of rejection of claims 21 through 36 and 38 through 40 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Suzuki (Answer 3; Br. 3).

Appellants argue the claims as a group (Br. in entirety). Thus, we decide this appeal based on independent claims 21 and 23. 37 C.F.R. § 41.37(c)(1)(vii) (2006).

The dispositive issue is whether the glass ceramic mass dielectric compositions described by Suzuki which contain a silicon oxide at an SiO₂ equivalent of 20 to 50 mol% and otherwise meet the ingredient limitations of independent claims 21 and 23, *prima facie* anticipate and/or render obvious the claimed compositions encompassed by these claims because Suzuki's compositions also meet the specified permittivity, quality, and Tf value property limitations. Appellants submit Appellant Schiller's Declaration under 37 C.F.R. § 1.132² (Schiller Declaration) with evidence bearing on the relative properties of the claimed compositions and those described by Suzuki, contending the evidence establishes that compositions

¹ We consider and refer to the translation of Suzuki prepared for the USPTO by the McElroy Translation Company (PTO 07-113 October 2006). We additionally consider the patent document and the computer translation thereof prepared by the Japanese Patent Office.

² The Schiller Declaration was submitted with the Amendment filed March 6, 2006. Appellants do not contend the evidence therein pertains to unexpected results.

containing the amounts of SiO₂ described by Suzuki do not satisfy the claimed property limitations (Br., e.g., 4).

The Examiner finds the glass ceramic material compositions of Suzuki's Examples 3-7 fall within the claims (Answer 3). The Examiner contends the Schiller Declaration does not accomplish Appellants' purpose because the evidence is not commensurate in scope with the claims which, like the disclosure in the Specification, do not limit the amount of SiO₂ in the glass ceramic mass, and does not represent the teachings of Suzuki (*id.* 4). With respect to the latter, the Examiner finds the evidence includes CaO and BaO that are not included in Suzuki's Examples 3-7, which Examples are not shown in the Schiller Declaration to have properties that fall outside the claims (*id.* 4-6).

Appellants contend Suzuki does not disclose the claimed properties, and the evidence in Declaration Table 1a shows that "once the SiO₂ % goes over about 12%," the claimed property values are not necessarily met, arguing the claimed properties must be met to reject the claims (Br. 3-4; Reply Br. 2). Appellants contend Suzuki teaches that an amount of SiO₂ below 20 mol% "makes vitrification difficult," teaching away from using an amount below that level (*id.* 4-5). Appellants contend SiO₂ is disclosed in the Specification to affect glassiness and not dielectric properties of the claimed material, and thus, one of ordinary skill in the art would use an amount of this material such that the claimed property limitations obtain (*id.* 5-6; Reply Br. 3-4).

Appellants contend the Schiller Declaration tests four compositions containing 0, 6, 12, and 22 % SiO₂, respectively, and shows only the compositions containing 0% and 6% SiO₂ meet the claimed property ranges,

while compositions containing “12% and above including the 20-50% of [Suzuki] do not meet” the claimed property ranges (Br. 7). Appellants further state “as seen from the Table, once the SiO₂ amount exceeds about 6%,” the values for the claimed properties are outside the claimed ranges (Reply Br. 3). Appellants contend “the values used in the declaration for the . . . [compositions] according to [Suzuki] are consistent with the values disclosed in” Suzuki, as set forth in the following table:

[Declaration] Table 1a provides :	[Suzuki] discloses:
La ₂ O ₃	20.6%
B ₂ O ₃	15.7%
TiO ₂	38.9
SiO ₂	22.0%
BaO, SrO, ZrO ₂	1% each
	Ln ₂ O ₃ Ln = lanthanide 20-50%
	B ₂ O ₃ 15.7%
	TiO ₂ 10-40%
	SiO ₂ 20-50%
	SrO 1-7%

Appeal Br. 8. Appellants contend the values used in the Declaration for the tested compositions “are based on values disclosed in the” Specification (Reply Br. 4-5).

The plain language of claims 21 and 23 encompass any manner of glass ceramic mass containing the specified oxide ceramic ingredients and the specified glass material ingredients in any amount resulting in a glass ceramic mass having the composition properties of permittivity, quality, and Tf value in the specified ranges. The ingredients “rare earth metal Rek” and “rare earth metal Reg” are not defined in the claims or specifically in the Specification, and thus, can be any member of the rare earth lanthanide and actinide series as disclosed in the Specification (Specification 7:18-21). *See, e.g., In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827, 1830 (Fed. Cir. 2004); *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). The open-ended terms

“comprising” and “containing” open the claims to include glass ceramic masses that include any amount of any additional ingredients in the oxide ceramic component and the glass material component or otherwise, such as silicon oxide SiO_2 and aluminum oxide Al_2O_3 , not otherwise provided for, limited only by the specified composition properties. *See, e.g., Exxon Chem. Pats., Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1555, 35 USPQ2d 1801, 1802 (Fed. Cir. 1995) (“The claimed composition is defined as comprising - meaning containing at least - five specific ingredients.”); *In re Baxter*, 656 F.2d 679, 686-87, 210 USPQ 795, 802-03 (CCPA 1981) (“As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term ‘comprises’ permits the *inclusion* of other steps, elements, or materials.”).

We find Suzuki describes a dielectric composition containing a glass component containing 10-40 mol% lanthanide series oxide Ln_2O_3 , 20-50 mol% SiO_2 , 5-20 mol% boric oxide B_2O_3 , 7-20 mol% aluminum oxide Al_2O_3 , and 10-40 mol% of at least one of zirconium oxide ZrO_2 , titanium oxide TiO_2 , and niobium oxide Nb_2O_5 , and a dielectric material component having a dielectric constant greater than the glass and containing any oxide containing titanium, such as TiO_2 (Suzuki, e.g., 1-2 and ¶¶ 0006 and 0014-0019). Suzuki discloses that if SiO_2 content is less than 20 mol%, “the glass easily deteriorates, and vitrification becomes difficult” (*id.*

¶ 0015). Suzuki further discloses the glass component can contain lead oxide PbO and bismuth oxide Bi₂O₃ (*id.* ¶ 0020). The oxide containing Ti of the dielectric material component can be such systems as BaO·nTiO₂ and BaO·4TiO₂·Ln₂O₃ (*id.* ¶ 0026). Suzuki discloses the taught dielectric composition can be baked at a temperature of less than 1,000°C (*id.* ¶ 0011).

Suzuki also discloses a multilayer wiring substrate formed from glass and ceramic substrate layers and from dielectric layers, the latter layers prepared from the described dielectric composition (*id.*, e.g., ¶¶ 0028-0034 and Fig. 1). The substrate layer is formed from an aluminum oxide skeleton component and from a glass component, wherein the glass component can be an alkali rare earth silicon system glass in which “SrO is essential, and it is preferable that it contains one or more types of CaO and MgO” (*id.* ¶ 0030).

Suzuki discloses in Table 1, dielectric compositions 1-10 wherein the glass components of Examples 1 through 10 satisfy the requirements for the ingredients of the glass material component of claim 21; the glass component of Examples 2, 9, and 10 contain niobium oxide Nb₂O₅ and thus, additionally satisfy the requirements for the ingredients of the glass material of claim 23. The glass ingredients of the Examples include at least SiO₂, B₂O₃, Al₂O₃, and La₂O₃, and 1 or more of ZrO₂, TiO₂, Nb₂O₅, Pr₆O₁₁, Nd₂O₃. The amount of SiO₂ ranges from 24-40 mol%. The ceramic component of the Examples satisfies the requirements for the specified ingredients of the oxide ceramic component of claims 21 and 23. Examples 11 and 12 are comparative examples, and the glass component of the latter

example contains SrO, CaO and MgO. *See id.* ¶¶ 0050-0055 and Tables 1 and 2. The exemplified dielectric compositions were baked for 10 minutes at 850°C (*id.* ¶ 0049).

We find Table 1a of Schiller Declaration sets forth four examples of glass ceramic mass compositions in which glass components have the following ingredients in mol%:

Glass material	1	2	3	4
La ₂ O ₃	22.3	20.9	20.1	20.6
B ₂ O ₃	33.9	31.6	25.7	15.7
TiO ₂	40.7	38.2	38.9	38.9
BaO	1.0	1.0	1.0	1.0
SrO	1.0	1.0	1.0	1.0
ZrO ₂	1.0	1.0	1.0	1.0
SiO ₂	0.0	6.0	12.0	22.0

Schiller Declaration 3. In Tables 1b-d, each of the compositions has the oxide ceramic component BaNd₂Ti₀₁₂, and each are baked at 790°C, 820°C, and 900°C, respectively. The results reported in Tables 1b-d show that only the glass ceramic mass compositions of Examples 1 and 2 (0.0% and 6.0% SiO₂) baked at 820°C have permittivity, quality, and Tf value properties falling within the claimed ranges. Declarant Schiller states “[a]s seen from the tables, increasing the silicon dioxide decreases the” claimed properties, and concludes silicon dioxide in the range taught by Suzuki would not meet the claimed properties (Schiller Declaration 3-4).

We find the glass ceramic material compositions 1-4 of the Schiller Declaration do not fall within the dielectric material compositions described by Suzuki (*see above* p. 6). In this respect, the amount of B₂O₃ in compositions 1-3 is outside the range disclosed by Suzuki; Al₂O₃ required in the compositions described by Suzuki is not present; the amount of TiO₂

and ZrO₂ fall outside the range disclosed by Suzuki; and there is no disclosure of SrO and BaO in the compositions described by Suzuki. Indeed, in view of the SrO and BaO ingredients, the glass components of the comparative compositions are more closely related to the glass component of the substrate layers used in the multilayer wiring substrate by Suzuki (*see above* p. 7). Thus, the compositions 1-4 of the Schiller Declaration are not representative of the glass ceramic mass described by Suzuki and, particularly, of Examples 1-10 in Suzuki's Table 1.

Furthermore, we determine the glass ceramic material compositions 1-4 of the Schiller Declaration find basis in appealed claim 21. However, there is no ingredient in the glass component corresponding to an "oxide of at least one pentavalent metal Me⁵⁺ selected from the group consisting of vanadium, niobium and tantalum" specified in appealed claim 23.

We further note that the glass ceramic materials prepared with compositions 1 and 2 possessed properties within the claimed ranges only when baked at 820°C, which temperature is close to the bake temperature of 850°C of Suzuki's Examples 1-10.

We recognize Appellants submitted the Schiller Declaration for the purpose of establishing that a glass ceramic composition containing ingredients falling within an appealed claim as well as an amount of SiO₂ within the range taught by Suzuki would not possess the claimed properties, in order to patentably distinguish over Suzuki. However, as the Examiner argues, in order to do so, such evidence must establish a result commensurate with the range of glass ceramic masses encompassed by the claims and described by Suzuki. On this record, we are convinced that the results reported for compositions 1-4 does not establish that the range of

glass ceramic materials and the properties thereof encompassed by the appealed claims as a class distinguishes over the range of ceramic materials described by Suzuki as a class. Indeed, the evidence presented is based on compositions which differ only in the amounts of the same ingredients and are not representative of appealed claim 23 and of the compositions described Suzuki. Thus, the evidence does not provide reasonable assurance that the same behavior shown for glass ceramic compositions 1-4 baked at 820°C would be exhibited by the myriads of compositions described by Suzuki and *prima facie* encompassed by claims 21 and 23, as we interpreted these claims above. *Cf., e.g., In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972);³ *cf. also, e.g., In re Clemens*, 622 F.2d 1029, 1035-36, 206 USPQ 289, 295-96 (CCPA 1980); *In re Greenfield*, 571 F.2d 1185, 1189, 197 USPQ 227, 230 (CCPA 1978). In re Susi, 440 F.2d 442, 445-46, 169 USPQ 423, 426 (CCPA 1971).

Accordingly, we have again evaluated all of the evidence of anticipation and of obviousness found in Suzuki with Appellants' countervailing evidence of and argument for non-anticipation and nonobviousness, including the evidence in the Schiller Declaration as relied on in the Brief and Reply Brief, and based thereon, we conclude that the

³ Here only one mixture of ingredients was tested. . . . The claims, however, are much broader in scope, covering mixtures of numerous compounds, . . . [such] that there is no 'adequate basis for reasonably concluding that the great number and variety of compositions included by the claims would behave in the same manner as the [single] tested composition.' [Citation omitted].

Lindner, 457 F.2d at 508, 173 USPQ at 358.

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claimed invention encompassed by appealed claims 21 through 36 and 38 through 40 would have been anticipated as a matter of fact under 35 U.S.C. § 102(b), and that the claimed invention encompassed by these appealed claims would have been obvious as a matter of law under 35 U.S.C. § 103(a).

The Primary Examiner's decision 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) (2007).

AFFIRMED

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