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. 22

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CYNTHIA M. FELISBERTO, STEPHEN A. MILKOVICH
and ROBERT W. NUFER

Appeal No. 1997-3884
Application No. 08/712,240

ON BRIEF

Before JOHN D. SMITH, Administrative Patent Judge, MCKELVEY, Senior Administrative Patent Judge, and PAWLIKOWSKI, Administrative Patent Judge.

PAWLIKOWSKI, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's refusal to allow claims 15, 16, 21- 27, 31-33, 35, 36, and 41-43.

BACKGROUND

Appellants' invention relates to a method of producing a ceramic sheet.

Exemplary claims 15, 21, and 35 are reproduced in the attached Appendix.

The prior art references relied upon by the examiner are:

Anderson et al. (Anderson)	4,104,345	Aug. 01, 1978
Nishigaki et al. (Nishigaki)	4,621,066	Nov. 04, 1986
Burn	4,766,027	Aug. 23, 1988

Claims 15, 16, 21-24, and 31-33, 35, 36, and 41-43 stand rejected under 35 U.S.C. § 103 as being unpatentable for obviousness over Anderson in view of Nishigaki et al. (Answer, page 2).

Claims 25-27 stand rejected under 35 U.S.C. § 103 as being unpatentable for obviousness over Anderson, in view of Nishigaki, and further in view of Burn. (Answer, page 2).

OPINION

After careful consideration of the issues raised in this appeal and with arguments of both appellants and the examiner, we find that the examiner's rejection of claims 15 and 16 is sustainable. However, with regard to the other claims, we find the rejections are not sustainable. Our reasoning follows.

The pivotal consideration concerns the aspect of appellants' invention with respect to the provision of ionic species in a ceramic slurry, wherein the ionic species are selected from the group consisting of boron compounds in their ionic form and phosphorus compounds in their ionic form.

Appellants' specification discusses on page 5, beginning at line 16, that the ionic species can be provided in one of two ways. One way is by adding boron in its ionized form or phosphorus in its ionized form, to the slurry. Another way is by adding nonionic phosphorous or nonionic boron to the slurry (e.g., adding phosphorus or boron in the form of P_2O_5 and B_2O_3, or adding phosphorus and boron as part of a glass composition,

from which phosphorus or boron can be leached into the binder solution during slurry making).

Appellants acknowledge that the examiner's position is that the boron species could leach out of a glass frit composition of Nishigaki if added to the Anderson's slurry formulation during slurry making. (Brief, page 13). Appellants' position is that "the present claims on appeal concern separate addition of boron or phosphorus species in free form to the slurry and not introduction of these ionic species via glass leaching." (Brief, page 14).

We agree with appellants' interpretation of their claims on appeal, quoted above, but only with respect to claims 21 and 35. We find, however, that claim 15 encompasses either embodiment of appellants' invention described on page 5, beginning at line 16, of the specification (summarized on pages 2-3 of this opinion). Claim 15 merely requires that the slurry <u>contain</u> ionic species in their ionic form, not that such species be added to the slurry in ionized form. See claim 15 in the attached Appendix.

We agree with the examiner's comments bridging pages 6 and 7 of the Answer, that ionic species of boron would result from adding the glass containing boron oxide of Nishigaki, into the slurry of Anderson. We also agree with the examiner that there is sufficient motivation for adding the glass containing boron oxide of Nishigaki to the slurry of Anderson for the reasons mentioned by the examiner. (Answer pages 6 and 7). Although appellants argue that Anderson and Nishigaki use different resin binders (Brief, page 12), it remains an art recognized benefit, that using the glass containing boron oxide of Nishigaki provides for a low temperature fired ceramic with a higher heating rate, thus saving production costs and time, which is proper motivation to combine the teachings of

these two references. Therefore, with regard to claim 15, and its dependent claim 16, we find the examiner has made a proper *prima facie* case.

With regard to claims 21 and 35, we find that each of these claims require the step of "adding ionic species", "in their ionic form" to the slurry. This step is not satisfied by in situ leaching of ionized phosphorus or boron species from, for example, a glass composition containing nonionized boron or phosphorus. No factual support exists in this record that would have led one skilled in the art to the method step of "adding ionic species to said ceramic green sheet . . . in their ionic form", as required by appellants' claims 21 and 35. Such is distinct from adding a glass frit (fluxes). Hence, we reverse the examiner's rejections of claims 21 and 35, including their dependent claims.

We need not consider the reference of Burn, which the examiner applied to claims 25-27, since these claims stand with claim 21.

CONCLUSION

The decision of the examiner to reject claims 15 and 16 under 35 U.S.C. § 103 over Anderson in view of Nishigaki is **affirmed**.

The decision of the examiner to reject claims 21-24, 31-33, 35, 36, and 41-43 under 35 U.S.C. § 103 over Anderson in view of Nishigaki is **reversed**.

The decision of the examiner to reject claims 25-27 under 35 U.S.C. § 103 over Anderson in view of Nishigaki and further in view of Burn is **reversed**.

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

JOHN D. SMITH Administrative Patent Judge	)	
FRED E. MCKELVEY Senior Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
BEVERLY A. PAWLIKOWSKI Administrative Patent Judge	)	

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APPENDIX

15. A method of producing a ceramic sheet, comprising the steps of:

(a) preparing a ceramic green sheet slurry **containing** ionic species, polyvinylbutyral, and a ceramic particulate consisting essentially of alumina and being devoid of boron species and phosphorus species, wherein said ionic species are selected from the group consisting of boron compounds in their ionic form, and phosphorus compounds in their ionic form; **[emphasis added]**

(b) dispersing said slurry on a substrate;

(c) allowing said dispersed slurry to set providing a ceramic green sheet with controlled microporosity; and then

(d) sintering said set slurry to produce a ceramic sheet.

21. A method of producing a ceramic sheet, comprising the steps of:

preparing a ceramic green sheet slurry containing polyvinylbutyral, ceramic particulate consisting essentially of alumina and being devoid of boron species and phosphorus species, and a solvent system;

adding ionic species to said ceramic green sheet slurry, wherein said ionic species are selected from the group consisting of boron compounds in their ionic form, and phosphorus compounds in their ionic form;

casting said ceramic green sheet slurry;

allowing said ceramic green sheet slurry to set to provide a green sheet having controlled microporosity, wherein a time for setting of said ceramic green sheet slurry with said ionic species is faster than for said ceramic green sheet slurry when devoid of said ionic species; and

sintering said ceramic green sheet slurry to produce a ceramic sheet.

35. A method of producing a multilayered ceramic structure from ceramic green sheets of controlled microporosity and compressibility, comprising the steps of:

preparing a ceramic green sheet slurry containing polyvinylbutyral, ceramic particulate consisting essentially of alumina and being devoid of boron species and phosphorus species, and a solvent system;

adding ionic species to said ceramic green sheet slurry, wherein said ionic species are selected from the group consisting of boron compounds in their ionic form, and phosphorus compounds in their ionic form;

casting said ceramic green sheet slurry;

allowing said ceramic green sheet slurry to set to provide a green sheet having controlled microporosity, wherein a time for setting of said

ceramic green sheet slurry with said ionic species is faster than for said ceramic green sheet slurry when devoid of said ionic species;

cutting discrete green sheet components from said set green sheet slurry and stacking said discrete green sheet components in registration with each other;

passing said discrete green sheet components together with heat and pressure sufficient to bring the surfaces of adjacent discrete green sheets into contact with each other and fusing said polyvinylbutyral to form a laminated, multilayered structure; and

sintering said laminated, multilayered structure to produce a multilayered ceramic structure.

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