

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CERAMTEC GMBH,
Petitioner,

v.

CERAMEDIC, LLC,
Patent Owner.

IPR2015-00398
Patent 6,066,584

Before GRACE KARAFFA OBERMANN, KRISTINA M. KALAN, and
JEFFREY W. ABRAHAM, *Administrative Patent Judges*.

KALAN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Petitioner CeramTec GmbH filed a Petition (Paper 2, “Pet.”) to institute an *inter partes* review of claims 1–5, 7–13, 15–17, 19–21, 23, 30–38, 52, and 53 of U.S. Patent No. 6,066,584 (Ex. 1001, “the ’584 patent”) pursuant to 35 U.S.C. §§ 311–319. Patent Owner CeraMedic LLC filed a Preliminary Response (Paper 7, “Prelim. Resp.”). We instituted an *inter partes* review of claims 1–5, 7–13, 15–17, 19–21, 23, 30–38, 52, and 53 on certain grounds of unpatentability alleged in the Petition (Paper 11, “Dec.”). After institution of trial, Patent Owner filed a Patent Owner Response (Paper 20; “PO Resp.”) and Petitioner filed a Reply (Paper 22; “Reply”). An oral hearing was held on March 4, 2016. A transcript of the hearing has been entered into the record. Paper 35 (“Tr.”).

The Board has jurisdiction under 35 U.S.C. § 6(c). In this Final Written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, we determine that Petitioner has shown by a preponderance of the evidence that certain claims for which trial is instituted, namely, claims 1–5, 7, 11–13, 15–17, 19–21, 23, 30–38, 52, and 53, are unpatentable.

A. *Related Matters*

The parties indicate that the ’584 patent is the subject of the following district court proceeding, among others: *CeraMedic, LLC v. CeramTec GmbH*, Civil Action No. 3:14-cv-001969 (N.D. Ind.). Pet. 1; Paper 4, 1. The ’584 patent also is the subject of an *inter partes* review in IPR2015-00424. Pet. 1–2; Paper 4, 1.

B. *The ’584 Patent*

The ’584 patent, titled “Sintered Al₂O₃ Material, Process for its Production and Use of the Material,” issued on May 23, 2000. The ’584

patent describes “sintered Al_2O_3 compositions produced from corundum powder and also methods for the use of the invented compositions as medical implants or tool material.” Ex. 1001, Abstract. An initially unsintered precursor having a relative density of $\rho \cong 55\%$ ¹ is produced from $\alpha\text{-Al}_2\text{O}_3$ powder having defined properties using at least two different dispersing methods, and this precursor is subsequently subjected to heat treatment and sintering. *Id.* The sintered material is characterized in part “by means of a dimensionless defect density,” or “DDD,” defined as the sum of the squares of the defect sizes per area analyzed. *Id.* at 4:16–20.

C. *Illustrative Claim*

Claim 1 of the '584 patent is reproduced below:

1. A method, comprising the steps of:
 - a) dispersing $\alpha\text{-Al}_2\text{O}_3$ powder having a mean particle size d_{50} of $\cong 0.30 \mu\text{m}$ and a chemical purity of $\cong 99.9\%$ $\alpha\text{-Al}_2\text{O}_3$ in an aqueous solution to create a mixture, said mixture effected through the application of at least two different dispersing methods;
 - b) treating said mixture so as to create a shaped unsintered body having a relative density of $\rho \cong 55\%$;
 - c) heating said unsintered body; and
 - d) sintering said unsintered body so as to create a sintered material.

Ex. 1001, 15:4–14.

D. *Prior Art References Relied Upon by Petitioner*

1. Jiang Tsair Lin, *Temperature History and Microstructure of Alumina* (May 1992) (Ph.D. dissertation, University of California, Berkeley) (“Lin”) (Ex. 1002);
2. U.S. Patent No. 4,777,153 to Sonuparlak & Aksay (“Sonuparlak”) (Ex. 1003);

¹ The symbols \cong and \geq are used interchangeably herein.

3. Tsung-Shou Yeh, *Effect of green microstructure on the densification and microstructural evolution of alumina* (Ph.D. dissertation, University of Florida) (1989) (reproduced by University Microfilms International) (“Yeh”) (Ex. 1004);

4. Tsung-Shou Yeh & Michael D. Sacks, *Low-Temperature Sintering of Aluminum Oxide*, 71 J. AM. CERAMICS SOC. 841 (1988) (“Yeh & Sacks”) (Ex. 1005);

5. Hiroyuki Mizuta et al., *Preparation of High-Strength and Translucent Alumina by Hot Isostatic Pressing*, 75 J. AM. CERAMICS SOC. 469 (1992) (“Mizuta”) (Ex. 1006);

6. U.S. Patent No. 4,647,477 to DeLuca (“DeLuca”) (Ex. 1007);

7. D. Cannell & P. Trigg, *Processing of Electronic Ceramics*, 1 ADVANCED CERAMIC PROCESSING & TECH. 95 (Jon G.P. Binner ed., 1990) (“Cannell”) (Ex. 1008); and

8. Martin P. Jones & Gerald V. Blessing, *Real-Time Ultrasonic Nondestructive Evaluation of Green State Ceramic Powders During Compaction*, 2 NONDESTRUCTIVE TESTING COMM. 155 (1986) (“Jones”) (Ex. 1009).

E. Instituted Grounds of Unpatentability

We instituted *inter partes* review on the following grounds of unpatentability asserted in the Petition:

Reference(s)	Basis	Claim(s) Challenged
Lin	§ 102(b)	1, 4, 5, 30, 33, 34, 52, and 53
Yeh	§ 102(b)	7, 12, 13, and 37
Lin	§ 103	36
Lin and Sonuparlak	§ 103	3, 19, 20, 23, and 31
Lin and Yeh	§ 103	7, 11, 13, 32, and 37
Lin, Yeh & Sacks, and Mizuta	§ 103	35
Lin, Yeh, and Sonuparlak	§ 103	12 and 38

Lin, DeLuca, and Cannell	§ 103	15–17
Lin, Sonuparlak, and Yeh & Sacks	§ 103	21
Lin and Jones	§ 103	2
Yeh	§ 103	8–10
Yeh and Sonuparlak	§ 103	38
Yeh and Lin	§ 103	11

II. ANALYSIS

A. *Claim Construction*

The Board interprets claim terms in an unexpired patent according to the broadest reasonable construction in light of the specification of the patent in which they appear. *See Cuozzo Speed Techs., LLC v. Lee*, No. 15–446, 2016 WL 3369425, at *12 (U.S. June 20, 2016) (upholding the use of the broadest reasonable interpretation standard); 37 C.F.R. § 42.100(b). Under that standard, and absent any special definitions, we give claim terms their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms must be set forth with reasonable clarity, deliberateness, and precision. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Only those terms which are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

In our Decision on Institution, we construed “dispersing α -Al₂O₃ powder . . . in an aqueous solution to create a mixture” to mean “causing α -

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