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.
13/141,451	06/22/2011	John Christopher Thomas	65017US005	5263

32692 7590 02/02/2017
3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER
BOYLE, KARA BRADY

ART UNIT	PAPER NUMBER
1766	

NOTIFICATION DATE	DELIVERY MODE
02/02/2017	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):

LegalUSDocketing@mmm.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOHN CHRISTOPHER THOMAS,
NEAL A. RAKOW,
and JOHN E. TREND

Appeal 2015-005767
Application 13/141,451
Technology Center 1700

Before ADRIENE LEPIANE HANLON, LINDA M. GAUDETTE, and BRIAN D. RANGE, *Administrative Patent Judges*.

HANLON, *Administrative Patent Judge*.

DECISION ON APPEAL

A. STATEMENT OF THE CASE

The Appellants filed an appeal under 35 U.S.C. § 134 from a final rejection of claims 1–13. Claims 14–19 are also pending but have been withdrawn from consideration. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

Representative claim 1 is reproduced below from the Claims Appendix of the Appeal Brief dated January 8, 2015 ("App. Br.").

1. A film comprising:

a hydrophobic, amorphous, substantially microporous, organosilicate composition comprising micropores which define a pore volume, and wherein the organosilicate composition comprises a composition prepared from a precursor reaction mixture comprising:

a solvent;

at least two organo-functional hydrolysable silanes; and

an acid; and

wherein the precursor mixture is deposited on a substrate to form a film; and heated to dry and calcine the mixture.

App. Br. 8.

The claims on appeal stand rejected as follows:

(1) claims 1–8 and 10–13 under 35 U.S.C. § 102(b) as anticipated by Raman et al.;[1] and

(2) claim 9 under 35 U.S.C. § 103(a) as unpatentable over Raman in view of Boury et al.[2]

B. DISCUSSION

1. Claim 1

The Examiner finds Raman discloses essentially the same process as disclosed by the Appellants. Ans. 3–4.[3] Thus, the Examiner finds "the microporous membranes of Raman . . . will inherently have the same properties as the films of the instant invention, i.e. being hydrophobic, amorphous, substantially

[1] N.K. Raman & C.J. Brinker, "Organic 'Template' Approach to Molecular Sieving Silica Membranes," 105 J. Membrane Sci. 273–279 (1995) ("Raman").
[2] Bruno Boury et al., "Generation of Microporosity in a Hybrid Material. Access to Pillared Amorphous Organosilicate," 11 Chem. Mater. 2796–2803 (1999) ("Boury").
[3] Examiner's Answer dated March 13, 2015.

microporous organosilicate film comprising micropores defining a pore volume" as recited in claim 1. Ans. 4.

The Appellants argue that Raman is not preparing an organosilicate network as claimed but rather is preparing an inorganic network. App. Br. 3. The Appellants disclose that "the term 'organosilicate' refers to compositions that are hybrids containing a covalently linked three dimensional silica network (-Si-O-Si-) with some organo-functional groups R, where R is a hydrocarbon or heteroatom substituted hydrocarbon group linked to the silica network by at least one Si-C bond." Spec. 3, ll. 1–4.

The Appellants contend the process disclosed in Raman and the claimed process differ as follows:

> Raman uses TEOS (tetraethoxysilane) and MTES (methyl triethoxysilane), of these only MTES is an organo-functional silane since TEOS contains no silicon-carbon bonds. In present claim 1 the precursor reaction mixture contains at least two organo-functional hydrolysable silanes.

App. Br. 4.

The Appellants argue that Raman prepares an inorganic matrix by heating to pyrolyze or "burn off" the organic groups, leaving behind an inorganic matrix. App. Br. 4. In contrast, "[w]hile heat is applied to dry and calcine the [Appellants'] mixture," the Appellants argue "the organic groups are not burned off as in Raman." App. Br. 4.

In response, the Examiner recognizes there is only one organo-functional hydrolysable silane in the example of Raman.[4] However, the Examiner concludes

[4] According to the Appellants' Specification, "a precursor mixture is prepared, coated on a substrate and heated to dry and/or calcine the precursor mixture to form a hydrophobic, amorphous, substantially microporous, organosilicate film."

that claim 1 "is recited in the product-by-process format, and different starting materials can produce the same precursor product."[5] Ans. 9 (emphasis omitted). According to the Examiner, during hydrolysis of TEOS and MTES in Raman, an acid catalyst reacts with two Si-OR bonds to form a Si-O-Si bond with an R-O-R byproduct. That is, hydrolysable groups (-OMe and -OEt) are removed from silicon atoms during hydrolysis, leaving only non-hydrolysable groups (-Me) as in the Appellants' process. *See* Ans. 10 (the groups removed during hydrolysis are the only differences between the Appellants' reactants and the reactants in Raman).

The Appellants do not direct us to any error in the Examiner's finding that non-hydrolysable groups remain after hydrolysis of TEOS and MTES in Raman. Rather, the Appellants argue that TEOS "is a major constituent forming 45–90 mol % of the reaction mixture used to form the network [in Raman]." Reply Br. 2[6] (citing Raman, Section 2.2). The Appellants argue:

> Because the precursor products of Raman are based upon a non-organofunctional hydrolysable silane (that is to say triethoxy silane ($Si(OEt)_4$)) [TEOS], the precursor product of Raman is going to have *a low organic content*, because only a small proportion of organosilicate bonds (that is to say Si-C bonds) are present because the starting materials in Raman are not 2 organofunctional hydrolysable silanes, but rather [are] an inorganic silane and 1 organofunctional hydrolysable silane.

Spec. 7, ll. 11–13. The Appellants disclose that "[t]he precursor mixture contains at least one hydrolysable silane." Spec. 7, l. 25.

[5] "If the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985).

[6] Reply Brief dated May 13, 2015. We note that the pages of the Reply Brief are not numbered. Therefore, we refer to the page numbers of the Reply Brief automatically generated in the electronic file of the instant Application.

Reply Br. 3 (emphasis added).

Significantly, claim 1 does not exclude TEOS. *See* Reply Br. 2 (recognizing that "claim 1 does have comprising language meaning that additional elements could be added to it"). Moreover, claim 1 does not recite the amount of the at least two organo-functional hydrolysable silanes in the precursor reaction mixture or the organic content in the precursor product. Thus, the Appellants' argument is not persuasive of reversible error.

Next, the Examiner finds Raman's precursor product is heated to temperatures of 150°C, 400°C, or 550°C, and the Appellants' precursors are calcined at temperatures ranging from 200°C to 500°C, with 450°C being a representative temperature. Ans. 11. The Examiner finds:

> Regardless of whether the term "inorganic" is used to describe the materials of Raman and "organosilicate" is used in the instant claims, the same precursor . . . is exposed to the same or lower temperatures in Raman . . . as described in the instant invention, which can and will produce the same results as heating the same precursor . . . to the same or higher temperatures.

Ans. 11.

The Examiner also finds:

> Raman specifically states that at temperatures of 450°C to 600°C are when methyl ligands are pyrolyzed. This means that at the temperatures of the instant specification which "calcine" the precursors of the invention, such as 450°C which are preferred, the methyl ligands must also at least begin to be removed, and at the lower temperatures in Raman . . . , i.e. 150°C and 400°C, they still remain in the organosilicate.

Ans. 12.

Referring to the disclosure in Raman Section 3.1 teaching calcination temperatures of 150°C and 400°C, the Appellants argue:

> [T]he Raman reference is a research journal article, and that Raman is using these lower temperature regimes to show what happens during the intermediate phases of the heating regime, and is not teaching that a xerogel that is heated to 150°C is a useful material, rather they are studying the progressive densification of the material as is described in the second paragraph of section 3.1. . . . In this paper they characterize the intermediate stages of calcination, to show the effect of the organic templates, but the teaching of this reference is to making an inorganic network by pyrolyzing the methyl groups.

Reply Br. 4.

It is of no moment, in the § 102(b) rejection on appeal, that Raman characterizes the product heated to 150°C as an intermediate product. "The anticipation analysis asks solely whether the prior art reference discloses and enables the claimed invention, and not how the prior art characterizes that disclosure or whether alternatives are also disclosed." *Hewlett-Packard Co. v. Mustek Sys.*, Inc., 340 F.3d 1314, 1324 n.6 (Fed. Cir. 2003).

In this case, Raman describes a precursor product comprising non-hydrolysable groups (-Me) that is calcined to a temperature (i.e., 400°C)[7] within the range used by the Appellants.[8] *See* Spec. 9, ll. 11–12 ("Typically the coated precursor mixture is heated to a temperature in the range of about 200°C to about 500°C."). Thus, the Examiner's finding that Raman's product is produced by substantially the same process as the Appellants' product is supported by a preponderance of the evidence.

Based on the foregoing, we find the burden properly shifted to the Appellants to show that Raman's precursor product, which is calcined to 400°C, does not inherently possess the characteristics of the claimed invention. *See In re*

---

[7] Raman 276–277 (Section 3.1); Raman Fig. 2.
[8] The organosilicate composition is subsequently tested to show N_2 adsorption. *See* Raman Fig. 2.

Best, 562 F.2d 1252, 1255 (CCPA 1977) (where the claimed and prior art products are produced by substantially identical processes, the Examiner "can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed invention"). The Appellants have failed to satisfy that burden. Therefore, the § 102(b) rejection of claim 1 is sustained.

The Appellants do not present arguments in support of the separate patentability of any of dependent claims 2–8 and 10–13. Therefore, the § 102(b) rejection of claims 2–8 and 10–13 is also sustained.

2. Claim 9

The Examiner relies on Boury to teach the organo-functional alkoxy silane recited in claim 9.[9] Ans. 9.

The Appellants argue that Raman and Boury "cannot be combined because the two references teach different networks and methods for forming the networks." App. Br. 6.

The Appellants' argument is not persuasive of reversible error. In the § 103(a) rejection on appeal, the Examiner merely relies on Boury to teach the organo-functional alkoxy silane recited in claim 9. Ans. 6–7, 14. The Examiner provides the following rationale for combining Raman and Boury:

> Both references are from the same field of endeavor (specifically microporous xerogel materials produced using an organosilicate precursor material), and it would have been obvious to use an organosilane B[10] [as claimed] . . . in the microporous, composition of

[9] Claim 9 depends from claim 7, which depends from claim 1, and recites that "at least one organo-functional alkoxy silane is of the formula: $(R^3O)_3Si\text{-}R^5\text{-}Si(OR^4)_3$ wherein R^3 and R^4 are alkyl or aryl groups, and R^5 is an alkylene, arylene or aralkylene group. App. Br. 9.

[10] The Examiner finds organosilane B disclosed on page 2797, second column, of Boury falls within the scope of the organosilane recited in claim 9. Ans. 14.

> Raman . . . in order to narrow the pore size distribution in the membranes (films) of Raman . . . [as] Boury . . . teaches that in the materials of the invention, increasing the pore distribution in the xerogels of the invention becomes narrow as the amount of B is increased.

Ans. 14; *see also* Ans. 7. The Appellants do not direct us to any error in the Examiner's rationale.

The Appellants also argue that "even if Raman could be modified with the monomers of Boury, the resultant network would be a network of the Raman invention and thus would be an inorganic silica network and not an organosilicate network." App. Br. 6.

In the rejection on appeal, the Examiner relies on the organosilicate composition formed at the lower temperatures disclosed in Raman (e.g., 400°C) and modifies that composition with organosilane B disclosed in Boury. The Appellants do not direct us to any evidence showing that modifying Raman as proposed by the Examiner would not result in an organosilicate composition. Rather, the Appellants argue that Raman teaches away from an organosilicate composition. App. Br. 6. We disagree.

We recognize that Raman discloses that organic membranes have certain disadvantages.[11] *See, e.g.*, Raman 274, col. 2 (disclosing a trade-off between permeability and selectivity in organic membranes). Nonetheless, Raman does not disclose that organic membranes are inoperable for their intended purpose. *See In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) (reference "teaches away" from proposed modification when modification would render apparatus disclosed in that

[11] "[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine." *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006).

reference "inoperable for its intended purpose"). Indeed, Raman discloses that CO_2/CH_4 separation using polymeric membranes is economically attractive. Raman 273, col. 1.

For the reasons set forth above, the § 103(a) rejection of claim 9 is sustained.

C. DECISION

The 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).

AFFIRMED