THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 32

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIROSHI YOKOGAWA, MASARU YOKOYAMA,
KOICHI TAKAHAMA and YURIKO UEGAKI

Appeal No. 95-1091
Application 07/916,973[1]

HEARD: January 13, 1998

Before KIMLIN, JOHN D. SMITH and WALTZ, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-12, 15, 16, 18 and 19. Claims 13, 20 and 21, the other claims

[1] Application for patent filed August 12,1992.

remaining in the present application, have been allowed by the examiner. Claim 1 is illustrative of the appealed claims:

1. A process of forming a hydrophobic aerogel comprising the steps of:

reacting a polymer having a skeleton structure of (SiO_2) with a hydrophobic agent having hydrophobic groups as well as functional groups reactive with silanol groups to obtain a hydrophobic polymer;

dispersing said hydrophobic polymer in a dispersing medium to form a resulting gel; and

supercritically drying said resulting gel at a temperature and pressure above a critical point of said dispersing medium to obtain a hydrophobic aerogel which has a porous structure.

The examiner relies upon the following references as evidence of obviousness:

Tewari et al. (Tewari)	4,610,863	Sept. 9, 1986
Unger et al. (Unger)	4,911,903	Mar. 27, 1990

T. M. Tillotson et al. (Tillotson), "Partially Hydrolyzed Alkoxysilanes as Precursors for Silica Aerogels," 121 Materials Research Society Symposium Proceedings 685-689 (C. Jeffrey Brinker et al. eds., Apr. 5-8, 1988).

Appellants' claimed invention is directed to a process for forming a hydrophobic aerogel which finds utility in the form of sheets for use as insulation within double glazed windows. The process entails the conventional formation of an alcogel of a polymer having a skeleton structure of (SiO_2) units, and using the known technique of converting the alcogel into a hydrophobic aerogel having a porous structure. Appellants' departure from

the prior art is reacting the polymer of the alcogel with a hydrophobic agent which replaces the silanol hydroxyl groups existing on the surface of the polymer with hydrophobic groups. According to appellants, the hydrophobic groups of the polymer result in an aerogel that is less sensitive to ambient moisture than the aerogels of the prior art, i.e., the aerogel of the present invention maintains its transparency and dimensional stability in humid environments.

Appealed claims 1-12, 15, 16, 18 and 19 stand rejected under 35 U.S.C. § 103 as being unpatentable over Tewari or Tillotson in view of Unger.

We have carefully reviewed the respective positions advanced by appellants and the examiner. In so doing, we concur with appellants that the prior art applied by the examiner fails to establish a prima facie case of obviousness for the claimed subject matter. Accordingly, we will not sustain the examiner's rejection.

The examiner recognizes that Tewari and Tillotson, the primary references, disclose what appellants acknowledge to be old, namely, the process of forming an aerogel by supercritically drying a silica alcogel. The examiner also appreciates that neither of the primary references teaches or suggests the claimed step of reacting the silica polymer with a hydrophobic agent

which reacts with the silanol groups of the silica polymer. To support the conclusion of obviousness for the claimed step not taught by the primary references, the examiner relies upon Unger.

Unger discloses a process of forming discrete particles of SiO_2 which are substantially without any porosity which find utility as calibration standards for determining the size of small objects and as sorption or carrier materials in the field of chromatography and separation techniques. Unger provides absolutely no teaching or suggestion that the product SiO_2 particles, which are formed by treating a sol of primary particles by the controlled addition of tetraalkoxysilane or organotrialkoxysilane, which particles have virtually no porosity, can be converted into a porous hydrophobic aerogel of the type disclosed by the primary references and presently claimed. In our view, the examiner has failed to factually establish that one of ordinary skill in the art would have had a reasonable expectation that Unger's step of forming SiO_2 particles having virtually no porosity could be incorporated into the processes of the primary references to obtain a porous hydrophobic aerogel, let alone an aerogel having the superior stability to moisture demonstrated in the present specification.

Accordingly, based on the foregoing, the examiner's decision rejecting the appealed claims is reversed.

REVERSED

EDWARD C. KIMLIN Administrative Patent Judge	)	
JOHN D. SMITH Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
THOMAS A. WALTZ Administrative Patent Judge	)	

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