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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 06-000970-00006-0000

Fecha: 2007-08-24 11:28:14 Dep. 2020 NUECREACIONE
Tra. 11 PATENTEIYI... Eve: 378 FASENACIONALI
Act. 538 PETICION Folios: 2

Señor

**SUPERINTENDENTE DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES**

E. S. D.

REF: Expediente No.:
Patente de Invención:

06-000.970

**"MATERIALES LIGNOCELULOSICOS
LIVIANOS DE RESISTENCIA
MEJORADA PARA PANELES
COMPUESTOS Y METODOS DE
MANUFACTURA"**

Titular:

J.M. HUBER CORPORATION

**Publicada en la Gaceta de la Propiedad Industrial No. 578 de
31 de Julio de 2007**

SOLICITUD DE EXAMEN DE PATENTABILIDAD

HUMBERTO RUBIO CAMACHO, mayor de edad, domiciliado en Bogotá, D.C., identificado con la cédula de ciudadanía número 17.192.062 de Bogotá, abogado en ejercicio, portador de la Tarjeta Profesional No. 50.007, expedida por el Consejo Superior de la Judicatura, actuando en carácter de **APODERADO** de la sociedad **J.M. HUBER CORPORATION** respetuosamente solicito a esa Dependencia:

- 1.- De conformidad con lo establecido en el Artículo 44 de la Decisión 486 de la Comisión de la Comunidad Andina y estando dentro del término legal de seis (6) meses contados desde la fecha de publicación en la Gaceta No. 578 de 31 de Julio de 2007, de la solicitud de la patente de la referencia, solicito se sirvan proceder a efectuar el examen de patentabilidad de la Invención.
- 2.- Para que la presente petición sea viable, estoy anexando el siguiente documento:
 - 2.1. Recibo de pago No. 07-67,605 de 22 de Agosto de 2007; de acuerdo con la Resolución No. 36155 de 28 de diciembre de 2.006.
- 3.- Por lo anterior solicito se continúe con el trámite correspondiente.

Atentamente,

HUMBERTO RUBIO CAMACHO
C.C. 17.192.062 de Bogotá
T.P. 50.007 Consejo Superior
de la Judicatura.
COD. 4134

06/2061/P000542

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

95
PARA USO EXCLUSIVO DE
HUMBERTO RUBIO S. C. S. A.

RECIBO OFICIAL DE CAJA : 07 - 67,605
FECHA : AGOSTO 22 DE 2007

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 06-000970- -00006-0000

Fecha: 2007-08-24 11:26:14 Dep. 2020 NUECREACIONE
Tra. 11 PATENTE/II Eve: 378 FASENACIONALI
Act. 538 PETICION Folios: 2

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
HUMBERTO RUBIO ABOGADOS LCONSIGNACION		BANCO POPULAR	050-00110-6	60253051	22/08/2007	18,748,400.00

***** CONCEPTO *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01 SOLICITUDES	85 EXAMEN DE PATENTABILIDAD DE INVEN	404,000.00
TOTAL :			\$ 404,000.00

SON: CUATROCIENTOS CUATRO MIL PESOS

RESPONSABLE :

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

DIVISIÓN DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 06-970

EL EXTRACTO DE LA PRESENTE SOLICITUD DE PATENTE DE INVENCION

FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No 578 DE

FECHA 31 DE JULIO DE 2007 EL TÉRMINO HÁBIL SEÑALADO POR LA LEY

EXPIRA EL 26 DE OCTUBRE DE 2007

NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS

SI _____

NO X

D1
97



US006171688B1

(12) **United States Patent**
Zheng et al.

(10) **Patent No.: US 6,171,688 B1**
(45) **Date of Patent: Jan. 9, 2001**

(54) **MATERIAL AND METHOD FOR THE PREPARATION THEREOF**

(75) Inventors: **James Zheng; Roger J. Morgan; Robert Jurek**, all of Midland, MI (US)

(73) Assignee: **Board of Trustees operating Michigan State University, East Lansing, MI (US)**

(*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

(21) Appl. No.: **09/246,527**

(22) Filed: **Feb. 8, 1999**

(51) Int. Cl.⁷ **B32B 5/16; B32B 5/18; C08J 9/32**

(52) U.S. Cl. **428/313.5; 264/45.3; 264/119; 264/122; 428/313.9; 428/317.9; 428/325; 428/326; 428/327; 523/218; 523/219**

(58) Field of Search **428/313.5, 313.9, 428/317.9, 325, 326, 327; 523/218, 219; 264/45.3, 119, 122**

(56) **References Cited**
U.S. PATENT DOCUMENTS

3,900,543 8/1975 Davis .

3,902,937	9/1975	Arndt et al. .	
4,144,372 *	3/1979	Beck	442/104
4,250,136	2/1981	Rex .	
4,403,107	9/1983	Hoffman .	
4,447,565	5/1984	Lula et al. .	
4,788,230	11/1988	Mudge .	
4,919,866	4/1990	Kubbutat .	
5,132,061	7/1992	Lindeman et al. .	
5,242,637	9/1993	Inoue et al. .	
5,492,756	2/1996	Seale et al. .	
5,585,054	12/1996	Evans .	
5,587,231 *	12/1996	Meteer et al.	442/375

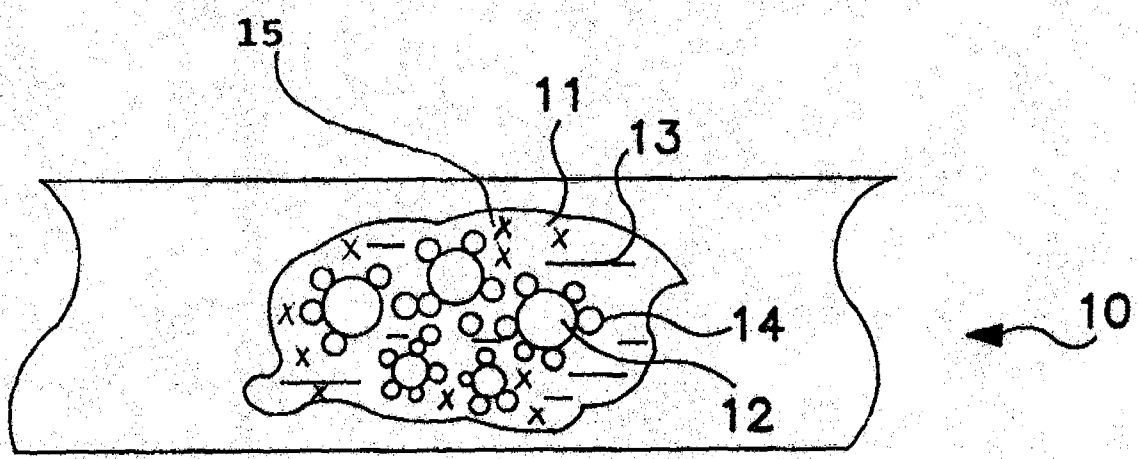
* cited by examiner

Primary Examiner—Blaine Copenheaver
(7A) *Attorney, Agent, or Firm*—Ian C. McLeod

(57) **ABSTRACT**

Composite products incorporating a polymer matrix, polymer microspheres, glass microspheres and natural fibers, particularly kenaf and wood fibers, are described. The polymer microspheres are 15 to 50 microns in diameter and are smaller than the glass microspheres which are 50 to 200 microns in diameter. The polymer microspheres reduce voids and prevent cracking of the glass microspheres upon compression. The composites have low cost and high strength.

14 Claims, 2 Drawing Sheets



MATERIAL AND METHOD FOR THE PREPARATION THEREOF

BACKGROUND OF THE INVENTION

(1) Summary of the Invention

The present invention relates to novel composite materials and methods for the preparation thereof. In particular, the present invention relates to composite material prepared by a method which uses combinations of relatively large glass microspheres and relatively small polymer microspheres admixed with a solid polymer, wood flour (particles) and natural fibers to provide composite materials having unique physical properties.

(2) Description of Related Art

Synthetic foam materials are mixtures of polymers and hollow microspheres. The resulting composite materials are lighter in weight than the solid polymer.

The patent art is shown by U.S. Pat. No. 3,900,543 to Davis; U.S. Pat. No. 3,902,997 to Andert et al.; U.S. Pat. No. 4,250,136 to Rees; U.S. Pat. No. 4,403,107 to Hoffman; U.S. Pat. No. 4,782,239 to Mudge; U.S. Pat. No. 4,447,565 to Loh et al.; U.S. Pat. No. 5,242,637 to Hogue et al.; U.S. Pat. No. 4,919,866 to Kubbitt; U.S. Pat. No. 5,332,061 to Lindeman et al.; U.S. Pat. No. 5,492,756 to Seale et al.; and U.S. Pat. No. 5,585,054 to Ivars.

Davis et al. describe buoyant foams using glass or plastic beads. Andert et al. describe a foam containing glass microspheres. Rees describes composite materials made of microspheres (10 to 200 microns) and microspheres (500 to 15,000 microns) with a polymer as a foam core. Hoffman describes a polymer material containing hollow glass microspheres. Mudge describes synthetic foams prepared by mixing a polymer and microspheres. Loh et al. describe microspheres used with a molecular sieve for water absorption. Ivars et al. describe composite products with a synthetic foam core. Kubbitt describes a foam containing glass microspheres and an epoxy resin and glass fibers. Lindeman et al. describe gaskets made of polymer microspheres. The microspheres are expanded in the formation of the gasket.

The use of local fibers in composite materials is described in U.S. Pat. No. 5,585,054 to Ivars and U.S. Pat. No. 5,492,756 to Seale et al. These patents do not describe the use of microspheres.

The problem in the prior art is faced with is to provide very low cost, higher strength composite materials using microspheres and various natural fibers, particularly kenaf fibers.

OBJECTS

It is therefore an object of the present invention to provide novel composite products and methods for preparing them using wood flour natural fibers and microspheres which have superior strengths. Further, it is an object of the present invention to provide composite products which are economical and easy to prepare. These and other objects will become increasingly apparent by reference to the following description and the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic front cross-sectional magnified view of the composite material 10 of the present invention.

FIG. 2 is a schematic view showing the steps in the preferred method of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention relates to a composite material which comprises in admixture: wood flour having a particle

size between about 150 and 250 microns; dried natural fibers having a width in a narrow dimension of between 40 and 60 microns and a length between about 0.5 and 2.5 cm; hollow first microspheres of a polymer having a diameter between about 15 and 50 microns; hollow second microspheres of glass having a diameter between about 50 and 200 microns which are larger than the polymer microspheres; and a cured polymer matrix, wherein the weight ratio of wood flour and fibers to first and second microspheres is between about 1 to 10 and 10 to 1.

Further, the present invention relates a method for preparing a composite material which comprises: mixing hollow first microspheres of a polymer having a diameter between about 15 and 50 microns with a liquid polymer to provide a first mixture; mixing hollow second microspheres of glass having a diameter between about 50 and 100 microns and larger than the first microspheres into the first mixture of step (a) to produce a second mixture; mixing wood flour having a particle size between about 50 and 400 microns into the second mixture to produce a third mixture; mixing natural fibers having a narrow dimension of 40 to 60 microns and lengths between about 0.5 and 2.5 cm into the third mixture to provide a fourth mixture; and introducing the fourth mixture in a mold so as to produce the composite material.

The materials of the present invention are preferably compression molded preferably between 35 and 300 psi. Increasing pressure provides increasing density.

The development of the preferred composite material of the present invention involved material survey and selection, material processability, performance and aesthetics as follows:

1. Material survey and selection:

Survey: Polymer thermoplastic or thermoset capable of forming stiff, strong, formed homogeneous compression-moldable sheets.

Selection decision: based on potential cost/performance/processability.

2. Processability:

Compression molding of foam sheets and board.

3. Performance Evaluation:

Flexural modulus and strength of developed material will be measured as initial performance evaluation. The material is tested following NEMA (National Electrical Manufacturers Association) standards.

4. Aesthetics:

Fillers, additives

Colors (combination of different colors for polymer and fillers).

An "Integral Foam" is a foam with a cellular core structure and a relatively smooth (hard) skin. The structure of an integral foam gives it high rigidity and bending/shear strengths. Wood is 5 to 10 times stiffer than integral foam. In all other respects, integral foam equals or exceeds wood's performance. It does not rot or absorb water nor is it a source of nourishment for insects. Large surface areas will not warp, split or splinter. Integral foams have the appearance, feel, weight and sound of wood.

Integral foam parts can be fastened using the same methods as with wood. Screws, staples, and nails have approximately the same retention properties as in wood. Joining elements such as tenons, grooves, dovetails, as well as mortice and tenon can be molded into the mating parts, saving assembly operations and providing excellent joint strength.

Integral foam can be made to look very much like wood with color and graining molded in, and the surface can be

finished with stains, waxes, varnish, and the like. Unlike wood, an integral foam does not possess a porous surface and so it resists discoloration.

The properties of integral foams change widely as a function of the method of manufacture, secondary treatment techniques, composition, density, dimension and shape etc. Among these factors, density is the most important parameter which determines the mechanical properties of an integral foam. A recent study shows that the tensile strength of polycarbonate foams is proportional to the foam density. It was also found that the relative tensile modulus of the foam increases as the square of the foam's relative density. However, these simple relationships between flexural strength or modulus and density of the foams are not universal for all polymer foams.

The composite products of the present invention are synthetic foams. As previously discussed, a "synthetic foam" is made using a resin matrix to which has been added hollow spheres of various materials. The resulting product is a closed cell foam-like material which is made without the use of a blowing agent. The most common matrix resins are epoxies and polyesters, although urethanes, PVC plastisols, and phenolic resins have also been used. Indeed, any polymer which can be made liquid, either before final polymerization or by heat, can be used as the binding matrix.

Synthetic foams are made by simply mixing the microspheres into the catalyzed resin until the desired consistency is obtained. In most cases the materials are mixed to a putty-like state or, if a casting material is desired, to a state in which the material can just be cast. The preferred ratio of filler to resin is approximately 60% filler by volume.

A synthetic foam provides a weight reduction with better resultant physical properties than if the polymer had been formed by chemical or physical means to the same specific gravity. The synthetic wood product made from resins and hollow spheres has the feel, look, and texture of real wood. Generally, the property improvements gained from using hollow glass beads are: water resistance, compressive strength, shrinkage and impact strength. Other significant advantages derived from utilizing hollow spheres are: low density, chemical stability and inertness, and crack arresting characteristics, which results in easy machining, sanding, nailing, and finishing.

In the present invention, the glass microspheres are larger than the polymer microspheres. The polymer microspheres fill in the interstices between the glass microspheres so that discontinuities in the composite material are reduced or eliminated and the strengths are increased. Further, the small polymer microspheres cushion the glass microspheres to prevent them from breaking. FIG. 1 is a sketch showing the composite material 10 which uses the polymer 11 as a matrix containing the relatively large glass microspheres 12, the fibers 13 and the relatively small polymer microspheres 14. The wood particles 15 are shown by "X". The preferred ratio of the diameters of the glass microspheres to polymer microspheres is between about 5 to 1 and 2 to 1. The glass microspheres are between about 50 and 200 microns in diameter. The polymer microspheres are between about 15 and 50 microns.

The fibers used in the present invention are dried natural fibers with hair-like projections from a main body of the fiber. Natural fibers are preferred, particularly kenaf fibers which have been removed or sorted to the required dimensions. Other fibers include wood plant fibers of various species, particularly those where the fibers have the hairy projections along their length. Such fibers are well known to those skilled in the art. The fibers have a width or a narrow

dimension of between 40 and 60 microns and lengths between about 0.5 and 2.5 cm.

The wood flour has a particle size between 50 and 400 microns. It is readily obtainable and inexpensive.

The glass microspheres can be made of recycled glass. The polymer microspheres can be composed of any polymer which does not dissolve during the formation of the composite material. With the preferred polyester resins of the present invention, the polymer microspheres are composed of a copolymer of vinylidene chloride and acrylonitrile. Cost is also a significant factor in the preferred polymer microspheres. Recycled polymers can be used as a source for producing the microspheres. The matrix polymers can be selected from:

Acrylonitrile-butadiene-styrene copolymer	(ABS)
Polystyrene	(PS)
Polycarbonate	(PC)
Phenolic	(P)
High density polyethylene	(HDPE)
Low density polyethylene	(LDPE)
Low low-density polyethylene	(LLDPE)
Polypropylene	(PP)
Polyurethane	(PU)
Polyethylene terephthalate	(PET)
Butyleneterephthalate	(PBT)
Poly(vinyl alcohol)	(PVC)
Polyetheretherketone	(PEEK)
Polyethylene oxide	(PEO)
Polyethylene glycol	(PEG)
Polyethylene sulfide	(PES)
Vinyl Resin	(VR)

Most preferred are polyester polymers, particularly STY-PGL-40-3951 (Cook Composites and Polymers Co., Kane, Mo.) which is a general purpose molding resin particularly where metal dies are used. This polymer produces a high gloss finish and very good physical properties. It is catalyzed by benzoyl peroxide (Cadox B paste), 40% emulsion (Cook Composites). The polymers can be thermoset or thermoplastic. Preferably the polymers are thermoset with a curing agent in a compression mold. The thermoset polymers are liquid for molding.

An advantage of the present invention is that complex shapes can be easily produced since the wood flour fibers are discontinuous and can conform to the mold. A further advantage is that voids are avoided. The molds can be metal or any material which allows the molding. Metal molds are preferred for compression molding. The compression can be up to the point where the glass microspheres collapse, which in the preferred composite materials described here with is between about 35 and 250 psi (0.241 to 1.73 MPa), which is about the crushing point of the glass spheres. Up to 500 psi (3.45 MPa) can be used with some glass spheres.

In the method of the present invention the order of addition of the ingredients is important as shown in FIG. 2. The polymer microspheres are mixed with the liquid resin first (step 1) in order to provide uniform dispersion. Then the glass microspheres are added to the mixture so that the polymer microspheres surround the glass microspheres (step 2). The wood flour is then added (step 3). The natural fibers are then blended into the mixture (step 4). The curing agent, if any, can be added at any point (preferably in the beginning) so long as the mixture remains sufficiently fluid for molding (steps 5 and 6).

Glass microspheres:

(1) R-1 from 3M. (Minneapolis, Minn.)

Size: 20 μ m to 90 μ m.

25		N-(3-chloro-4-methylbenzyl)-5-hydroxy-1-methyl-6-oxo-1,6-dihydropyrimidine-4-carboxamide	308	1
26		Chiral 5-hydroxy-N-[(1R,2S)-2-hydroxy-2,3-dihydro-1H-inden-1-yl]-1-methyl-2-[4-[(4-methylpiperazin-1-yl)methyl]phenyl]-6-oxo-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	490	3
27		Chiral N-(4-fluorobenzyl)-5-hydroxy-2-[4-[(2R)-2-(methoxymethyl)pyrrolidin-1-yl]methyl]phenyl]-1-methyl-6-oxo-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	481	3
28		Chiral N-(4-fluorobenzyl)-5-hydroxy-2-[4-[(2S)-2-(methoxymethyl)pyrrolidin-1-yl]methyl]phenyl]-1-methyl-6-oxo-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	481	3
29		N-(4-fluorobenzyl)-2-[4-[(4-fluorobenzyl)amino]methyl]phenyl]-5-hydroxy-1-methyl-6-oxo-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	491	3
30		2-benzyl-N-(4-fluorobenzyl)-5-hydroxy-1-(2-morpholin-4-ylethyl)-6-oxo-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	467	1
31		1-[2-(dimethylamino)ethyl]-N-(4-fluorobenzyl)-5-hydroxy-6-oxo-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	335	1
32		N-(4-fluorobenzyl)-5-hydroxy-6-oxo-1-(pyridin-3-ylmethyl)-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	353	1

Average particle density: 0.125 g/cc (7.8 pcf).

Strength—Collapse: 250 psi (1.73 MPa), 10%.

(2) FOCOSPHERE RP from Emerson & Cuming, Inc. Canton, Mass.

Size: 40 to 150 μ m

Average particle density: 0.25 g/cc (15.6 pcf).

Strength—% Collapse: 500 psi (3.45 MPa), 14%.

Polymer Microspheres

EXPANCEL 351, Expanded ICN, Duluth, Ga.

Komat Fibers, Mississippi State University

Wood Flour, American Wood Fibers, Sheffield, Wis.

Polymer polyester resin and 1 wt % catalytic benzoyl peroxide were well mixed in a plastic beaker at room temperature first. The mixture then was degassed in a vacuum oven for 10 minutes at 50°C. After degas, weighted hollow spheres were added to the mixture and well mixed with polyester resin. For up to 40 vol % microspheres contents, liquid molding method (no pressure was applied during casting) was employed because the viscosity was low for those samples. However, for 60% (volume percent) and higher microspheres content samples, compression molding was performed using a Tenebracon press with the following processing conditions:

The preheated heating is from room temperature to 220°F. The heating rate was 10°F/minute; dwell one hour, the compression force was set at 2,000 lb (746 kg) (minimum setting of the equipment) for 4"x2" (10.2x5.1 cm) mold and 3,000 to 11,000 lb (4,103 kg) for 8"x8" (20.3x20.3 cm) mold.

EXAMPLE 1

A total of 12 prototype boards were fabricated. The boards with various densities were made using different formulations. Table 1 shows the formulations used for tests.

TABLE 1

Compositions used to make boards

Polymer	Weight parts					
	glass bubbles	wood fiber	wood flour	plastic bubble	density (pcf)	note
1	200	45	40	0	36.7	22 *
2	300	35	29	0	40.3	*
3	100	30	0	30	37.2	22
4	100	35	0	30	39.0	22
5	100	30	0	25	38.0	22
6	150	30	0	30	39.6	*
7	100	30	15	15	40.9	*
8	200	35	15	15	42.6	22 *
9	100	15	15	15	38.3	22 *
10	100	15	15	15	36.5	1-Rib
11	100	15	15	15	38.4	wood
12	150	15	15	15	38.7	22, wood

Processing

Polyester resin and 1 wt % catalytic benzoyl peroxide were well mixed in a plastic beaker at room temperature first. The weighted glass bubbles were added to the mixture and well mixed with polyester resin. Then, weighted glass bubbles were added into the mixture and well mixed. Wood flour then was added and mixed. Last, kenaf fibers were mixed into the mixture. Compression molding was performed using a Tenebracon press with following processing conditions:

Room temperature to 220°F at a heating rate 10°F/minute, with a dwell at 220°C for one hour. The compression force was set at 2000 lb. for 8"x8" mold (45.3 pcf).

Material Testing

Five samples were tested by a third party as indicated in Table 1 (*) in the note column). The formulations of the boards have been adjusted according to the feedback from the testing results. Sample 39 through 812 were the best samples.

Mechanical Properties

The mechanical properties have been tested using the #9 formulation. The average (5 specimens) flexural modulus is 515,000 PSI and flexural strength is about 1,300 PSI.

Moisture Absorption

The moisture absorption tests show that the #9 sample only absorb 0.1% water after 15 days at 25°C, 50% RH. At 35°C and 90% RH, the material absorb about 1.4% moisture after 27 days.

Dimensional Stability

The dimensional change was non-detectable at following conditions:

Temperature from 25 to 60°C, RH from 50 to 90%. In other words, the dimensional change for this material (8"x8"x1/8" size board) from 25°C to 60°C, and RH 50 to 90%, is less than 1/1000 in (100 μ m).

It is intended that the foregoing description be only descriptive of the present invention and be limited only by the hereinafter appended claims.

We claim:

1. A composite material which comprises in admixture:

(a) wood flour having a particle size between about 50 and 400 microns;

(b) dried natural fibers having a width in a narrow dimension of between 40 and 60 microns and a length between about 0.6 and 2.5 cm;

(c) hollow first microspheres of a polymer having a diameter between about 15 and 20 microns;

(d) hollow second microspheres of glass having a diameter between about 50 and 200 microns which are larger than the polymer microspheres; and

(e) a cured polymer matrix, wherein the weight ratio of wood flour and fibers to first and second microspheres is between about 10 to 1 and 1 to 10.

2. The composite of claim 1 wherein the first microspheres are essentially insoluble in a liquid polymer which forms the cured polymer.

3. The composite of any one of claim 1 or 2 wherein the cured polymer is a cured polyester polymer.

4. The composite material of claim 1 wherein the first microspheres are composed of a copolymer of vinylidene chloride and acrylonitrile.

5. The composite material of any one of claim 1 or 2 which has been compression molded.

6. The composite material of claim 1 wherein the first microspheres are composed of a copolymer of vinylidene chloride and acrylonitrile, the cured polymer is a polyester polymer and the natural fiber is kenaf fiber.

7. The composite material of claim 6 which has been compression molded.

8. A method for preparing a composite material which comprises:

(a) mixing hollow first microspheres of a polymer having a diameter between about 15 and 30 microns with a curable liquid polymer to provide a first mixture;

(b) mixing hollow second microspheres of glass having a diameter between about 50 and 400 microns and larger

than the first microspheres into the first mixture of step (a) to produce a second mixture;

(c) mixing natural fibers having a narrow dimension of 40 to 60 microns and lengths between about 0.6 and 2.5 cm into the second mixture to provide a third mixture;

(d) mixing wood flour having a particle size between about 30 and 400 microns into the third mixture; and

(e) introducing the fourth mixture in a mold so as to produce the composite material.

9. The method of claim 8 wherein the first microspheres are essentially insoluble in the liquid polymer during the curing.

10. The method of any one of claim 8 or 9 wherein the liquid polymer is a polyester polymer which is admixed with a curing agent.

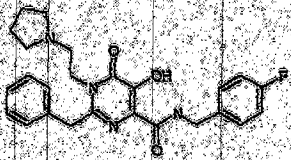
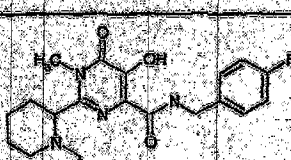
11. The method of claim 8 wherein the first microspheres are composed of a copolymer of vinylidene chloride and acrylonitrile.

12. The method of claim 8 wherein the first microspheres are composed of a copolymer of vinylidene chloride and acrylonitrile, the liquid polymer is a polyester polymer and the natural fibers are kenaf fibers.

13. The method of any one of claim 8, 10, 11 or 12 wherein the composite material is compression in the mold.

14. The method of claim 8 wherein the compression molding is at a pressure of between about 25 and 500 psi.

* * * * *

33		2-benzyl-N-(4-fluorobenzyl)-5-hydroxy-6-oxo-1-(2-pyrrolidin-1-ylethyl)-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	451	1
34		2-benzyl-N-(4-fluorobenzyl)-5-hydroxy-6-oxo-1-(2-piperidin-1-ylethyl)-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	465	1
35		2-(2-benzylpiperidin-2-yl)-N-(4-fluorobenzyl)-5-hydroxy-1-methyl-6-oxo-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	451	4
36		N-(4-fluorobenzyl)-5-hydroxy-1-methyl-2-(1-methylpiperidin-2-yl)-6-oxo-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	375	4
37		2-(1-benzylpiperidin-3-yl)-N-(4-fluorobenzyl)-5-hydroxy-1-methyl-6-oxo-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	451	4
38		1-(3-((dimethylamino)methyl)benzyl)-N-(4-fluorobenzyl)-5-hydroxy-6-oxo-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	411	3
39		N-(2,3-dimethoxybenzyl)-1-[2-(dimethylamino)ethyl]-5-hydroxy-6-oxo-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	377	1
40		N-(2,3-dimethoxybenzyl)-5-hydroxy-6-oxo-1-(pyridin-3-ylmethyl)-1,6-dihydropyrimidine-4-carboxamide (TFA salt)	397	1

100
100

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIRECCION DE NUEVAS CREACIONES

2020

Abogado
HUMBERTO RUBIO CAMACHO

ASUNTO	Radicación	06-970
	Trámite	011
	Evento	378
	Actuación	430
	Oficio	E 0 1 8 8 5
	Folios	04

Patente de Invención	☒	Patente de Modelo de Utilidad	☐
Vía Nacional	☐		
Vía PCT (fase nacional)	☐	Cap. I	☒
		Cap. II	☐

No. Sol. Internacional: PCT/us2004/012204
Fecha de Presentación Internacional: 20 de abril de 2004

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. Documentos estudiados

Descripción:	Folios: 6 a 47 como se radico inicialmente
Reivindicaciones:	Folios: 48 a 51 como se radico inicialmente
Dibujos:	Folios: 53 a 55 como se radico inicialmente
Prioridad:	16 de julio de 2003, US 10/619,449

2. Objeto de la invención

Título de la invención

Materiales lignocelulósicos livianos de resistencia mejorada para paneles compuestos y métodos de manufactura (folio 1)

El problema planteado en esta solicitud consiste en desarrollar paneles de estructura orientada (OSB, *oriented strand board*) con baja densidad o peso, sin causar pérdida en las propiedades mecánicas útiles del OSB.

Para solucionar este problema técnico se desarrolla un panel compuesto de estructura orientada con materiales lignocelulósicos livianos con n relleno de baja densidad y su método de fabricación.

El objeto de la invención se catalogó como B32B3/26, B32B27/00, B32B27/28 según la Clasificación Internacional de Patentes (IPC).

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3. De la solicitud de Patente (según el caso)

Descripción (artículo 28 D 486)

- El solicitante debe hacer las conversiones correspondientes para expresar todas las unidades de las variables utilizadas en el capítulo descriptivo y reivindicatorio en el Sistema Internacional, de uso obligatorio en Colombia.
- Se deben corregir los errores de mecanografía "de" folio 8 párrafo 3, "rellenadotes" folio 10 párrafo 1, "geneal" folio 20 párrafo 1 y "hidrofilitos" folio 29 párrafo 2.

Reivindicaciones (artículo 30 D 486)

- Los términos "en una cantidad efectiva", "al menos" y "de menos" en las reivindicaciones 5, 6, 8, 14 y 15, utilizados para definir el rango de varias características del método o del material lignocelulósico compuesto deben eliminarse. Estos términos no permiten establecer un intervalo puntual para cada una de las características técnicas, no siendo estas precisas y por lo tanto no claras, ya que no permiten una comparación con el estado de la técnica.
- La reivindicación 3 no es concisa ya que tiene el mismo alcance de la reivindicación 2.
- Las reivindicaciones 18 y 21 de método, se definen por características del tablero obtenido a través del método, como son rigidez a la flexión y espesor del tablero, lo cual es inaceptable. Al respecto no debe olvidarse que las reivindicaciones de producto y de procedimiento son diferentes y, por ello, deben redactarse de manera independiente en el pliego reivindicatorio. Sobre las mismas, el Tribunal Andino de Justicia ha dicho lo siguiente:

"El objeto de la invención de producto esta constituido por un cuerpo cierto destinado a llenar una necesidad industrial que el estado de la técnica aun no ha satisfecho. En cambio, el objeto de la invención de procedimiento se encuentra conformado por "una serie o sucesión de operaciones que inciden sobre una materia (sólida, líquida o gaseosa) que se encamina a la obtención de una cosa o un resultado". (Otero Lastres, José Manuel. Ob. Cit)¹.

- Las reivindicaciones 27 y 28 no son claras, ya que no se pueden catalogar como reivindicaciones de producto o de procedimiento (método), lo anterior con base al artículo 14 D486 "*Los países miembros otorgan patentes para las invenciones, que sean de producto o de procedimiento, en todos los campos de la tecnología,...*". Por lo anterior estas reivindicaciones deben redactarse en su preámbulo como de método, producto o eliminarse.

En conclusión, el capítulo reivindicatorio no cumple con el requisito de claridad y concisión de acuerdo con el artículo 30 de la Decisión 486.

4. Determinación del Estado de la Técnica

Considerando que la fecha de presentación de la primera solicitud de patente de la cual se reivindica prioridad es: 16 de julio de 2003, se buscaron documentos del estado de la técnica relacionados, con fecha de publicación anterior a esta.

Nº	Documento	Título	Fecha de publicación
D1	US6171688	MATERIAL AND METHOD FOR THE PREPARATION THEREOF	2001-01-09

¹Proceso 129-IP-2007

5. Análisis de patentabilidad (según requisito) (artículo 14 D486)

Es importante mencionar que el siguiente análisis de patentabilidad se realizó teniendo en cuenta las objeciones del numeral 3 de la presente comunicación.

Novedad (artículo 16 D486)

Respecto a la reivindicación 1

La reivindicación independiente 1 dice: "Un material lignocelulósico compuesto para tablero que comprende por medio de mezcla, un aglomerante polimérico curado, microesferas huecas contactadas en las superficies por medio de una resina; y piezas de madera predominantemente lignocelulósicas, en la cual las piezas de madera están unidas en forma discontinua por medio del aglomerante"

Respecto al estado de la técnica:

D1 describe un material compuesto y su método de fabricación. En particular la invención se refiere a un material compuesto preparado por una combinación de en mayor cantidad de microesferas de vidrio y relativamente una pequeña cantidad e esferas de polímero mezcladas con un polímero solido, harina de madera y fibras naturales para proveer un material compuesto con propiedades físicas únicas (Col 1 líneas 6-13). El método para preparar el material compuesto: (a) mezclar las microesferas de polímero con un diámetro entre 15 a 50 micras con un polímero líquido curable para proveer un primer mezcla; (b) mezcla con una segunda microesferas con un diámetro entre 50 a 100 micras y que están en mayor cantidad que las esferas de la primera mezcla; (c) mezcla las fibras naturales en la segunda mezcla para proveer un tercera mezcla; (d) mezclar la harina de madera dentro de la tercera mezcla; (e) introducir la cuarta mezcla en un molde para producir el material compuesto. En La tabla 1 muestra las densidades de diferentes paneles que dependen de la formulación.

Respecto a la solicitud en estudio:

CARACTERÍSTICAS ESENCIALES DE LA INVENCION	D1 US6171688
Un material lignocelulósico compuesto para tablero que comprende por medio de mezcla	SI (Col 1 líneas 7-13, Ej. 1)
un aglomerante polimérico curado	SI (Col 6 líneas 41-44)
microesferas huecas contactadas en las superficies por medio de una resina	SI (Col 6 líneas 36-40)
y piezas de madera predominantemente lignocelulósicas	SI (Col 6 líneas 31-35)

De acuerdo con el cuadro anterior donde se comparan las características técnicas de la reivindicación 1 con la anterioridad D1, se concluye que el material lignocelulósico descrito en la reivindicación 1, ya era conocido en el estado de la técnica como se evidencia con la anterioridad encontrada. Por lo tanto la reivindicación 1 y sus dependientes no pueden considerarse nuevas.

Respecto a la reivindicación 16:

La reivindicación independiente 16 dice: "Un método para hacer un material lignocelulósico compuesto para tablero que comprende: mezclar microesferas

103 103

huecas con un aglomerante polimérico curable para formar un material granular recubierto con el aglomerante; combinar piezas de madera lignocelulósicos con el material granular recubierto con el aglomerante con el fin de proveer una mezcla que forme el compuesto; consolidar la mezcla que forma el compuesto bajo calor y presión efectivos para formar un tablero compuesto en el cual las piezas de madera están aglomeradas discontinuamente con la resina"

CARACTERÍSTICAS ESENCIALES DE LA INVENCION	D1 US6171688
Un método para hacer un material lignocelulósico compuesto para tablero que comprende:	SI (Reiv. 8)
mezclar microesferas huecas con un aglomerante polimérico curable para formar un material granular recubierto con el aglomerante	SI (Col 6 líneas 62-64)
combinar piezas de madera lignocelulósicos con el material granular recubierto con el aglomerante con el fin de proveer una mezcla que forme el compuesto	SI (Col 7 líneas 3-7)
consolidar la mezcla que forma el compuesto bajo calor y presión efectivos para formar un tablero compuesto en el cual las piezas de madera están aglomeradas discontinuamente con la resina	SI (Col 7 líneas 8-10, Col 6 líneas 1-3)

De acuerdo con el cuadro anterior donde se comparan las características técnicas de la reivindicación 16 con la anterioridad D1, se concluye que el método para hacer un material lignocelulósico compuesto descrito en la reivindicación 16, ya era conocido en el estado de la técnica como se evidencia con la anterioridad encontrada. Por lo tanto la reivindicación 16 y sus dependientes no pueden considerarse nuevas.

6. Conclusión:

Los requisitos de patentabilidad de la presente solicitud se encuentran afectados así:

Nº	Documento	Reivindicaciones afectadas	Requisito que afecta
D1	US6171688	1-26	Novedad

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de 60 días contados a partir de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única N° 10 de 2001.

ALIX CARMENZA CÉSPEDES DE VERGEL
Directora de División de Nuevas Creaciones (C)

El anterior requerimiento fue notificado por fijación en lista, de fecha
12 FEB. 2010

CONCEPTO TÉCNICO No. 315	EXAMINADOR TÉCNICO Código No. 202090
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