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CUIDADO ORAL

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☒ Patente de Invención.

☐ Patente de Modelo de Utilidad.

☐ Capítulo I.

☒ Capítulo II.

2

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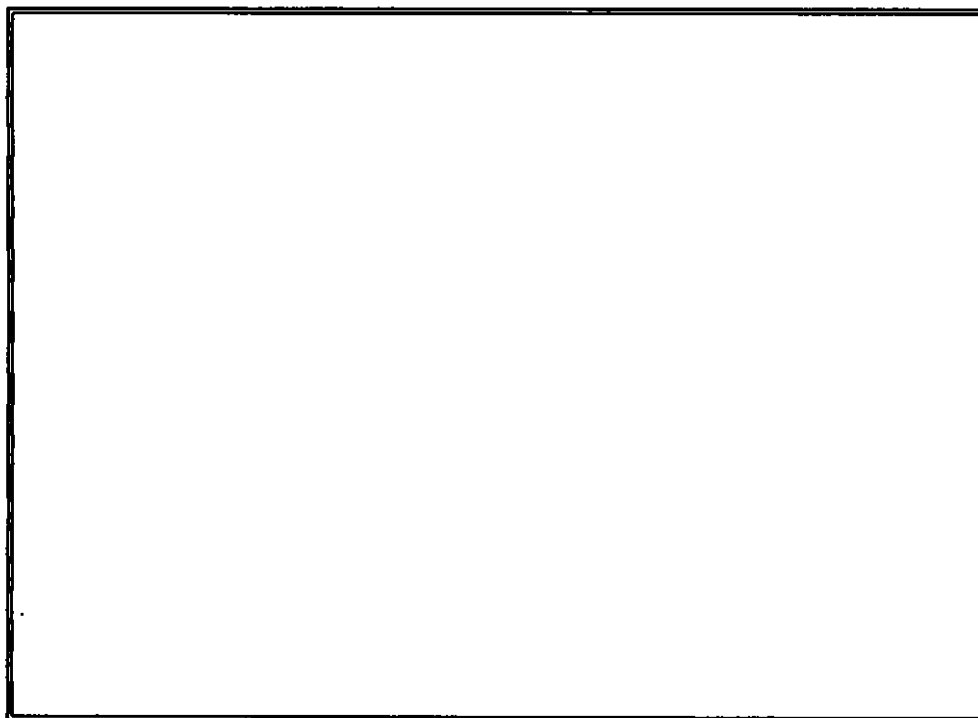
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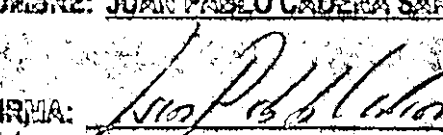
ANEXOS

- ☒ Comprobante de pago de la tasa de presentación de la solicitud. \$443.000
- ☒ Documento que acredite la existencia y representación legal cuando el solicitante sea persona jurídica.
- ☒ Poderes, si fuere el caso. **Fotocopia autenticada**
- ☐ Documento de cesión del inventor al solicitante o a su causante.
- ☐ Declaraciones
- ☒ Copia de la solicitud internacional. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Copia del examen preliminar efectuado por la IPEA.
- ☒ Traducción del examen preliminar efectuado por la IPEA.
- ☐ De ser el caso, copia del contrato de acceso.
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas.
- ☐ De ser el caso, certificado de depósito del material biológico.
- ☐ Arte final 12x12.
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud.
- ☒ Otros: Tarjeta de propietarios.

11 FIGURA CARACTERÍSTICA:



12 Solicito la concesión de la patente,

NOMBRE: JUAN PABLO CADENA SARMENTOFIRMA: 

C.C. 80.410.337 de Usaquén T.P. 57492 del C.S.U.

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60421,037 24 October 2002 (24.10.2002) US
- (71) Applicants (for all designated States except US): COLGATE-PALMOLIVE COMPANY [US/US]; 300 Park Avenue, New York, NY 10022 (US); DOW CORNING CORPORATION [US/US]; 2200 West Salzburg Road, Midland, MS 38686 (US).
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(54) Title: SILICON MODIFIED POLYAMIDE MATERIAL USEFUL FOR ORAL CARE

(57) Abstract: The invention is directed to a new material useful in oral care products such as dental floss or as a toothbrush bristle. The material is a silicon-modified polyamide blended with a different polyamide material. The preferred different polyamide material is the conventional material used to make bristles of toothbrushes. The different polyamide material is preferably a nylon material.

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(54) TITLE: SILICON MODIFIED POLYAMIDE MATERIAL USEFUL FOR ORAL CARE

(57) Abstract: The invention is directed to a new material useful in oral care products such as dental floss or as a toothbrush bristle. The material is a silicon-modified polyamide blended with a different polyamide material. The preferred different polyamide material is the conventional material used to make bristles of toothbrushes. The different polyamide material is preferably a nylon material.

SILICON MODIFIED POLYAMIDE MATERIAL USEFUL FOR ORAL CARE

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Background of the Invention

The invention is drawn to a novel silicon modified polyamide material that is useful in the oral care field. For example, the material can be used as filaments that can be used as toothbrush bristles, interdental brushes, paint brush bristles such as for a cleaning or whitening system, dental floss tape (string), dental strips or tube applicators etc.

10

Several patents describe bristles of tooth brushes. For example, US 6,327,736 discloses making bristles for a toothbrush from a plastic material chosen from a group of plastics consisting of polyamides and polyesters. Polyamides include nylon. Other patents that discuss making bristles and/or dental floss are US 6,475,553

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Manufacturers of nylon bristle toothbrushes have provided in the past, a variety of toothbrushes designated as "soft," "medium," and/or "hard" to indicate the stiffness of the bristles. For a given thermoplastic polymeric composition, one factor, which predominantly determines bristle stiffness, is the diameter of the individual bristles. For example, with nylon 6,12 the "soft" bristles typically have a diameter between 0.007 and 0.008 inches; "medium" bristles have a diameter between 0.008 and 0.009 inches and "hard" bristles have a diameter greater than about 0.010 inches. Polybutylene terephthalate bristles are typically about 0.001 to 0.002 inches smaller in diameter due to the greater wet stiffness of this material over that of nylon 6,12. For all bristles used in toothbrushes, there is generally a manufacturing or grading tolerance of about +/- 0.0005 inches.

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Soft, medium, and hard bristles are all effective in cleaning teeth while soft bristles are more gentle on the gum and soft tissues of the oral cavity, medium and hard bristles show stronger brushing actions on the tooth surfaces.

US 6,138,314 discloses making bristles for a toothbrush from polyamide materials such as nylon materials. The synthetic polyamides useful in the bristles of toothbrushes includes those which are of sufficient molecular weight to be fiber-forming such as: polycaprolactam, polyhexamethylene adipamide, polyhexamethylene sebacamide, the
5 polyamide formed from 1,4,(cis)cyclohexane-bis(methylamine) and adipic acid (see U.S. Pat. No. 3,012,994); the polyamide from m-xylene diamine and adipic acid (see U.S. Pat. No. 2,916,475); the polyamide from 3,5 dimethyl hexamethylene diamine and terephthalic acid (see U.S. Pat. No. 2,752,358); the polyamide from 2,5 dimethyl piperazine and adipyl chloride (see U.S. Pat. No. 3,143,527). See also U.S. Pat. No. 2,152,606. The preferred
10 polyamides are polyhexamethylene adipamide; and polyhexamethylene sebacamide. In general, the number average molecular weight of the polymer used for these bristles should be in excess of 10,000 and preferably greater than 30,000 to provide the strength and stiffness needed in a toothbrush bristle. The commercial polyamides preferred include nylon 6, nylon 6,6; nylon 6,10 and nylon 6,12.

15 US 5,560,377 discloses making dental floss from a composite of a multifilament yarn bonded to an extruded monofilament. Both elements are made of polymer compounds, preferably nylon, to provide desired ease of use of the monofilament as a leader to pass the implement easily between the teeth or under bridges while the multifilament yarn can be provided in looped embodiments, as a bush element or in the
20 form of one or more tails thus providing superior flossing action when passed between the teeth or under bridges.

US Pat. No. 6,604,534 (" '534 patent"). discusses monofilament tapes and monofilament interproximal devices. The '534 patent discusses the following patents as being relevant to monofilament interproximal devices: U.S. Pat. Nos. Re 35,439;
25 3,800,812; 4,974,615; 5,760,117; 5,433,226; 5,479,952; 5,503,842; 5,755,243; 5,845,652;

5,884,639; 5,918,609; 5,962,572; 5,998,431; 6,003,525; 6,083,208; 6,148,830; 6,161,555; and 6,027,592, the disclosures of which are hereby incorporated herein by reference.

These dental tapes generally have serious shortcomings in gentleness, in delivering coatings during flossing and in being handled easily and conveniently during flossing.

5 U.S. 6,051,216 discloses the use of cosmetic compositions containing siloxane based polyamides as thickening agents.

SUMMARY OF THE INVENTION

It is an object of the present invention to develop a new material useful in the oral care industry.

10 It is another object to develop a new material useful as a filament, preferably a monofilament or bristle used in the oral care industry, in particular in an oral care product. An oral care product would be any known product that is used in the mouth or for the mouth. For example, an oral care product can be but is not limited to a toothbrush, paintbrush, dental floss tape (string), dental strips or tube applicators dental tape etc. The
15 bristle can be used for a toothbrush that can be used on a manual non-electric or electric toothbrush that has superior properties with respect to sensory and antibacterial.

Another object of the present invention to develop a new material that can be used for dental floss that has superior properties with respect to sensory and antibacterial.

Another object of the present invention is to use the bristle on a paint brush that
20 can be used to apply whitening compositions to the teeth (bleaching the teeth) or a cleaning composition to the teeth.

One aspect of the invention is a filament which comprises a silicon-modified polyamide material blended with a different polyamide material. The different polyamide material can be the commercial or prior art material that is used for dental floss or
25 toothbrush bristles, such as the materials discussed above, which include nylon. The

filament can be used in dental floss, dental tape, a toothbrush bristle or a paint brush bristle. The paint brush can be used in an application to place a whitening composition such as a bleaching composition on the teeth to make the teeth whiter.

DETAILED DESCRIPTION OF THE INVENTION

5 We have found a new material used for making filaments that can be used in any oral care product. The material can be used as a filament such as but not limited to tooth brushes, dental floss, dental tape, and paint brushes. The paint brushes can be used to apply a cleaning, whitening or any other composition to the mouth and preferably the teeth. The filament can be substituted for any commercial oral care product that contains a
10 filament. The commercial oral care product would be made in any known manner.

 We have found that the incorporation of silicone into polyamides results in new physical and chemical properties that modify and improve the performance of the polyamides. The modification means changing the hydrophilicity or hydrophobicity of the polyamides or changing the lubricity of the polyamides. Improvements can also be
15 introduced by the functionalities attached to the silicones, which can exhibit antibacterial properties or affinity for certain metal ions, quaternary ammonium ions, fluoride ions or beneficial enzymes. Changes in the physical properties of polyamides include altering the crystallinity of polyamides, for example, reducing the crystallinity of the polyamide for example, Nylon 6,6 to a level similar to that of Nylon 6,12. These properties, when
20 present in nylon resins can provide superior benefits for making toothbrush bristles and dental floss.

 Siliconized polyamides, contain both silicone moieties and amide moieties in the backbone. The silicone component comes with unique flexibility, stability and surface tension properties, while the amide moieties make the molecule compatible with other
25 polyamides, such as, the ones described in the background of the invention which are not

limited to nylon. As discussed above, polyamides, such as nylon are a key material for toothbrush and dental floss technology. It is conceived that the siliconized polyamide will modify the other polyamide structure, such as the polyamide structures discussed above in the background of the invention section which includes, nylon structure when mixed, and particularly the surface structure of the polyamide such as nylon so that the modified polyamide (i.e. nylon) for bristles and dental floss are softer, and more lubricious. This would provide a significant benefit to reduce toothbrush trauma to the gingival, which is a major cause of gingival recession. More importantly, it is also known that silicone has very low surface tension, and such a property would be ideal for reducing bacterial adhesion and accumulation on the surfaces of toothbrush bristles (anti-attachment), a pro-hygenic effect which would be viewed as desirable by the consumer. Therefore, siliconized polyamide modified polyamides such as, but not limited to nylons are superior materials for toothbrush bristle and dental floss.

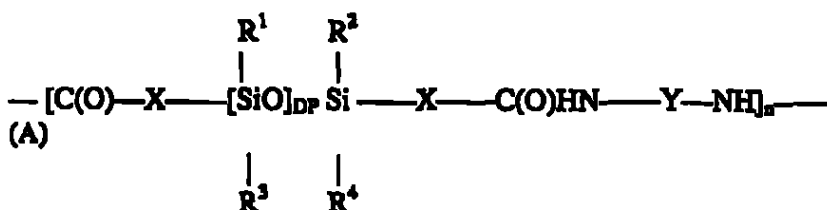
In addition, the chemistry involved in developing siliconized polyamides can also be used to graft other silicones such as cationic silicones or non-silicone moieties such as quaternary ammonium ions to nylon to achieve superior properties desired for toothbrush bristles and dental floss. Siliconized polyamides used according to this invention described in detail in US patent No. 6,051,216 (" '216 patent") which is incorporated by reference in its entirety for all useful purposes. The '216 patent claims a silicon-modified polyamide comprises

a) 0.5-80 percent by weight based on the total weight of the composition of at least one siloxane-based polyamide;

(b) 5-95 percent by weight silicone fluid; and

(c) if (a)+(b) do not equal 100 percent, then a portion of solvent sufficient to make 100 percent, wherein:

the siloxane-based polyamide is formed from units of Formula A



where: (1) n is a number selected from the group consisting of 1-500, where n is the number of units in the polyamide;

(2) DP is an average value for degree of polymerization of a siloxane portion of the polyamide and is selected from the group consisting of 1-700;

(3) X is a linear or branched chain alkylene having 1-30 carbons;

(4) each of R^1 - R^4 is independently selected from the group consisting of methyl, ethyl, propyl, isopropyl, a siloxane chain, and phenyl, wherein the phenyl may optionally be substituted by 1-3 members from the group consisting of methyl and ethyl; and

(5) Y is selected from the group consisting of linear or branched chain alkenes having 1-40 carbons, wherein the alkylene group itself may optionally be substituted by at least one member selected from the group consisting of

(i) hydroxy;

(ii) C₃-C₈ cycloalkane;

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(iii) 1-3 members selected independently from the group consisting of C₁-C₃ alkyls; phenyl optionally substituted by 1-3 members independently selected from the group consisting of C₁-C₃ alkyls;

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(iv) C₁-C₃ alkyl hydroxy; and

(v) C₁-C₄ alkyl amine;

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or Y may be Z where $Z=R^{20}T(R^{22})R^{21}$ where each of R²⁰, R²¹ and R²² is independently selected from the group consisting of linear and branched C₁-C₁₀ alkyl or alkylene groups; and T is selected from the group consisting of CR, where R is selected from the group consisting of hydrogen, the group consisting of the group defined for R¹-R⁴; and a trivalent atom selected from the group consisting of N, P and Al; and wherein each value for X, Y, DP and R¹-R⁴ may be the same

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or different for each unit in the polyamide. In addition, the siloxane-based polyamide preferably (1) comprise both siloxane groups and amide groups to thicken compositions containing silicone fluids (volatile and/or non-volatile silicone fluids); (2) are non-flowable solids at room temperature; and (3) dissolve in a fluid which contains silicone at a temperature of 25-160 degrees C. to form a

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translucent or clear solution at a temperature in this range.

When making a toothbrush, the filaments lie in close proximity to each other as the result of winding or braiding the filaments, or generally as the result of stranding the filaments. The surface area of the filaments can be subjected to partial dissolving by means of chemical agents. In this manner, the filaments merge completely together and
5 any cavities still remaining in the center of the wound or braided bristle are closed. This process can be supported by any existing or selectively variable tensile stress acting on the filaments. Altogether a cavity-free bristle is thus produced, offering bacteria or other germs no possibility of infiltration.

The following values have proven to be especially suitable in particular for an
10 electric toothbrush: three or four filaments per bristle are used, the diameter of the individual filaments lies between approximately 0.0762 mm and 0.127 mm, approximately, and the winding or braiding of a bristle is repeated after every 1.0 mm approximately to 3.0 mm, approximately.

The bristles may be formed by melt extruding various thermoplastic polymeric
15 materials through appropriately shaped extrusion orifices in various dies following various processes such as described in U.S. Pat. Nos. 2,226,529 and 2,418,482; 3,745,061; 3,238,553; 3,595,952; 4,279,053; and French Patent No. 2,125,920.

The tufting, cutting, stapling, etc., of the bristles is performed by processes known in the art; for instance as described in U.S. Pat. Nos. 4,441,227; 4,688,857; 979,782;
20 5,274,873; 5,335,389; and 5,511,275, the disclosures of which are hereby incorporated herein by reference.

Experiments with blends of siliconized polyamides and polyamides such as nylon have indicated that the two polymers are miscible above their melting temperature, and they are compatible at the macro-scale at room temperature. Optical microscopy was
25 employed to demonstrate that at the micro-scale, the silicone component occupies a

specific volume fraction within the resulting tertiary structure of filaments. This demonstrated the role of silicone as a modifier of nylon.

The following additional examples were conducted:

Masterbatches with 20% polyamide additive in Nylon 6,6 and Nylon 6,12 were produced. The masterbatches did not contain anything else. Masterbatches had to be produced carefully to ensure a good dispersion of the low-melting additive in the Nylons. Fibers were produced using Nylon 6,6 and Nylon 6,12 to identify correct processing conditions for both. In general Nylon 6,6 was processed around 285-290°C in the fiber line and Nylon 6,12 was processed around 235-240°C. Fibers were prepared using a round die containing 41 die holes. Fibers are "flat yarn" and are 6-8 denier per filament (250-325 total denier). Fibers were then prepared using correct letdown ratios of the masterbatch in appropriate resins. The following data gives average values from tensile and DSC data.

Nylon 6,6 fibers

Additive level (%w/w)	Tenacity* grams/tex	Elongation at peak (%)	Elongation at break (%)	Crystallinity (%)	Melting point deg. C
0	17.64	353	359	26.6	265.3
1	14.84	429.4	599.8	27	265.9
3	17.01	217.1	392.1	22.2	266.8

Nylon 6, 12 fibers

Additive level (%w/w)	Tenacity* grams/tex	Elongation at peak (%)	Elongation at break (%)	Crystallinity (%)	Melting point deg. C
0	22.71	216.4	292.9	28	217.9
1	18.04	240.3	332.1	26.5	218.5
3	20.19	306.9	402.3	28.1	217.2

Tenacity reported is breaking tenacity

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A comparison was made between mixed toothbrush bristles with siliconized polyamide coated on nylon bristles and bristles with unmodified nylon. The modified nylon showed unexpectedly improved results.

In addition, a microbiological assay of bacterial attachment to toothbrushes was performed, and the table below presents examples illustrating the new and improved bacterial anti-attachment properties of the new material. To evaluate the ability of bacteria to attach to the surface of the toothbrush bristles, an experiment was designed to quantify the number of bacteria which were left after a certain amount of rinsing time. Bacteria chosen for this experiment were selected from the many orally relevant species. One such suitable species of bacteria is *Actinomyces naeslundii*, a well-known early colonizer of the mouth. A bacterial suspension of *A. naeslundii* was first prepared by inoculating trypticase soy broth (TSB). After incubation overnight at 37.5 °C, the suspension was diluted with additional TSB until the optical density (O.D.) was between 0.015 and 0.2. (The optical density in this case corresponds to the overall quantity of bacteria in the suspension.) The toothbrushes were carefully cleaned with mild detergent and then disinfected for 60 seconds in 70% ethanol. After air drying, the bristles of the brushes were dipped into the bacterial suspension for 60 seconds, rinsed in phosphate buffered saline (PBS) for 0-60 seconds, then brushed over the surface of separate agar plates. These agar plates were incubated for 2 days at 37.5 °C at which time a visual inspection was made of the colony forming units (CFU's).

At higher concentrations of bacteria, > 0.05 O.D., it was not possible to count the CFU's reliably. However, in a visual inspection of these experiments there was always clearly a less dense lawn of bacterial colonies on the plate brushed with the silicone containing bristles. As the bacterial load was reduced to a OD of 0.017-0.020, two out of

15/16

three experiments performed showed a clear 18-25% reduction in bacteria in toothbrushes with Nylon 6,6 + 3% silicone-modified polyamide, relative to Nylon 6,12.

trial	Toothbrush Material		% reduction
	Nylon 6,12 (CFU)	Nylon 6,6 with 3% additive (CFU)	
1	290	387	25
2	980	1192	18

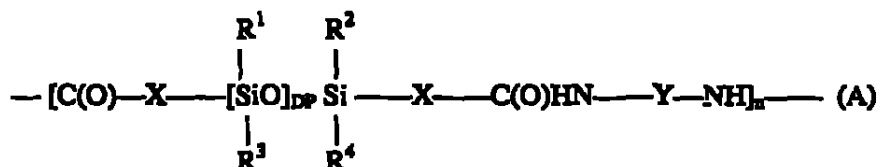
5 All the references discussed in this application are incorporated by reference in their entirety for all useful purposes.

While there is shown and described certain specific structures embodying the invention, it will be manifest to those skilled in the art that various modifications and rearrangements of the parts may be made without departing from the spirit and scope of the underlying inventive concept and that the same is not limited to the particular forms
10 herein shown and described.

We claim:

1. A material useful in oral care products which comprises a silicon-modified polyamide blended with a different polyamide material.
2. The material as claimed in claim 1, wherein said different polyamide material
5 is a synthetic polyamide.
3. The material as claimed in claim 1, wherein said different polyamide material is nylon 6, nylon 6,6; nylon 6,10 or nylon 6,12.
4. The material as claimed in claim 1, wherein said different polyamide material is nylon 6,6.
- 10 5. The material as claimed in claim 1, wherein said siloxane-based polyamide (1) comprise both siloxane groups and amide groups to thicken compositions containing silicone fluids (volatile and/or non-volatile silicone fluids); (2) are non-flowable solids at room temperature; and (3) dissolve in a fluid which contains silicone at a temperature of 25-160 degrees C. to form a translucent or
15 clear solution at a temperature in this range.
6. The material as claimed in claim 1, wherein the silicon-modified polyamide comprises
 - a) 0.5-80 percent by weight based on the total weight of the composition of at least one siloxane-based polyamide;
 - 20 (b) 5-95 percent by weight silicone fluid; and
 - (c) if (a)+(b) do not equal 100 percent, then a portion of solvent sufficient to make 100 percent, wherein:

the siloxane-based polyamide is formed from units of Formula A



where: (1) n is a number selected from the group consisting of 1-500,
where n is the number of units in the polyamide;

(2) DP is an average value for degree of polymerization of a siloxane
portion of the polyamide and is selected from the group consisting of 1-
700;

(3) X is a linear or branched chain alkylene having 1-30 carbons;

(4) each of R^1 - R^4 is independently selected from the group consisting of
methyl, ethyl, propyl, isopropyl, a siloxane chain, and phenyl, wherein the
phenyl may optionally be substituted by 1-3 members from the group
consisting of methyl and ethyl; and

(5) Y is selected from the group consisting of linear or branched chain
alkylenes having 1-40 carbons, wherein the alkylene group itself may
optionally be substituted by at least one member selected from the group

consisting of

(i) hydroxy;

5 (ii) C₃-C₈ cycloalkane;

(iii) 1-3 members selected independently from the group consisting of C₁-C₃ alkyls; phenyl optionally substituted by 1-3 members independently selected from the group consisting of C₁-C₃ alkyls;

10

(iv) C₁-C₃ alkyl hydroxy; and

(v) C₁-C₆ alkyl amine;

15

or Y may be Z where $Z = R^{20} T(R^{22})R^{21}$ where each of R²⁰, R²¹ and R²² is independently selected from the group consisting of linear and branched C₁-C₁₀ alkyl or alkylene groups; and T is selected from the group consisting of CR, where R is selected from the group consisting of hydrogen, the group consisting of the group defined for R¹-R⁴; and a

20

trivalent atom selected from the group consisting of N, P and Al; and wherein each value for X, Y, DP and R¹-R⁴ may be the same or different for each unit in the polyamide.

7. The material as claimed in claim 6, wherein said different polyamide material is nylon 6, nylon 6,6; nylon 6,10 or nylon 6,12.

8. The material as claimed in claim 6, wherein said different polyamide material is nylon 6,6.

9. A filament which comprises said material as claimed in claim 1.

10. A filament which comprises said material as claimed in claim 8.

5 11. An oral care product which comprises at least one of said filament as claimed in claim 9.

12. The oral care product as claimed in claim 11, wherein the product is a toothbrush, dental floss, dental tape or paint brush.

10 13. Dental floss which comprises at least one of said filaments as claimed in claim 9.

14. A toothbrush bristle which comprises at least one of said filaments as claimed in claim 10.

15. A toothbrush which comprises at least one toothbrush bristle as claimed in claim 13.

15 16. The toothbrush as claimed in claim 15, wherein said toothbrush is an electric toothbrush.

17. The toothbrush as claimed in claim 15, wherein said toothbrush is a non-electric toothbrush.

20 18. A brush used for whitening the teeth which comprises at least one of said filaments as claimed in claim 9.

19. Dental tape which comprises at least one of said filaments as claimed in claim 9.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/33914

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61K 8/00, 7/16

US CL : 424/49, 50, 401, 404, 443; 433/80, 216, 217.1; 428/364, 480; 525/50, 66, 98, 166, 179, 222

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 424/49, 50, 401, 404, 443; 433/80, 216, 217.1; 428/364, 480; 525/50, 66, 98, 166, 179, 222

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,251,410 B1 (SCHIRALDI ET AL) 26 June 2001 (26.06.2001), see the entire document, especially column 5, lines 12-23.	1-19
Y	US 6,141,819 A (DRIESEN ET AL) 07 November 2000 (07.11.2000), see the entire document, especially col. 4, lines 30-65.	1-19
Y	GB 2,169,912 A (DAICEL CHEMICAL INDUSTRIES LTD.) 23 July 1986 (23.07.1986), see the entire document.	1-19

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

Special categories of cited documents

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"W" document member of the same patent family

Date of the actual completion of the international search

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Date of mailing of the international search report

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Publicado:

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12 de Agosto de 2004

Para códigos de dos letras y otras abreviaciones, referirse a las "Notas de guía sobre Códigos y Abreviaturas" que aparecen al comienzo de cada edición de la Gaceta del PCT.

(54) Título: MATERIAL DE POLIAMIDA MODIFICADA DE SILICIO UTIL PARA EL CUIDADO ORAL

57) Resumen: La invención se dirige a un material nuevo útil en productos para el cuidado oral tales como hilo dental o como las cerdas de un cepillo de dientes. El material es poliamida modificada con silicona mezclada con un material de poliamida diferente. El material de poliamida diferente preferido es el material convencional utilizado para hacer cerdas de cepillos de dientes. El material de poliamida diferente es preferiblemente un material de nylon.

MATERIAL DE POLIAMIDA MODIFICADA DE SILICIO UTIL PARA EL
CUIDADO ORAL

Antecedentes de la Invención

5

La invención está delineada a un material nuevo de poliamida modificada de silicio que es útil en el campo del cuidado oral. Por ejemplo, el material puede usarse como filamentos que pueden usarse como cerdas para cepillo de dientes, cepillos inter-dentales, cerdas de brocha para pintar tales como para un sistema de limpieza o de blanqueado, cinta de hilo dental (hilo), cintas dentales o aplicadores de tubo, etc.

15

Varias patentes describen cerdas de cepillos de dientes. Por ejemplo, la patente de los Estados Unidos de América número 6,327,736 describe el hacer cerdas para un cepillo de dientes de un material plástico escogido de un grupo de plásticos que consisten de poliamidas y poliésteres. Las poliamidas incluyen a nylon. Otra patente que describe el hacer cerdas y/o hilo dental es la patente de los Estados Unidos de América número 6,475,553.

20

Fabricantes de cepillos de dientes de cerdas de nylon han proporcionado en el pasado, con una variedad de cepillos de dientes designados como "suave", "mediano", y/o "duro" para indicar la tiesura de las cerdas. Para una composición dada polimérica de termoplástico, un factor, que predominantemente determina la tiesura de la cerda, es el diámetro de las cerdas individuales. Por ejemplo, con el nylon 6,12 las cerdas "suaves" típicamente tienen un diámetro de entre 0.007 y 0.008 pulgadas; cerdas "medianas" tienen un diámetro de entre 0.008 y 0.009

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pulgadas, y cerdas "duras" tienen un diámetro mayor de alrededor de 0.010 pulgadas. Las cerdas de polibutileno tereftalato son típicamente de alrededor de 0.001 a 0.002 pulgadas más pequeñas en diámetro debido a la mayor
5 tiesura húmeda de este material sobre aquella del nylon 6,12. Para todas las cerdas usadas en cepillos de dientes, hay generalmente una tolerancia de fabricación o gradiente de alrededor de ± 0.0005 pulgadas.

10 Las cerdas suaves, medianas, y duras son todas efectivas en la limpieza de los dientes mientras que las cerdas suaves son más gentiles en las encías y los tejidos suaves de la cavidad oral, las cerdas medianas y duras muestran más fuertes acciones de cepillado sobre las
15 superficie del diente.

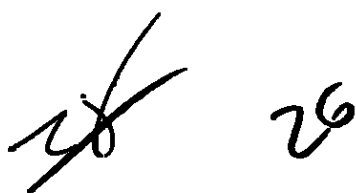
La patente de los Estados Unidos de América número 6,138,314 describe la fabricación de cerdas para un cepillo de dientes de materiales de poliamida tales como
20 materiales de nylon. Las poliamidas sintéticas útiles en las cerdas de los cepillos de dientes incluyen a aquellas que son de suficiente peso molecular para ser formadoras de fibra tales como: policaprolactama, polihexametileno adipamida, polihexametileno sebacamida, la poliamida
25 formada de 1,4(cis)ciclohexano-bis(metilamina) y de ácido atípico (véase la patente de los Estados Unidos de América número 3,012,994); la poliamida de m-exileno diamina y ácido adípico (véase la patente de los Estados Unidos de América número 2,916,475); la poliamida de 3,5 dimetil
30 hexametileno diamina y ácido tereftalato (véase la patente de los Estados Unidos de América número 2,752,358); la poliamida de 2,5 dimetil piperazina y cloruro adipilo (véase la patente de los Estados Unidos de América número

3,143,527). Véase también la patente de los Estados Unidos de América número 2,152,606. Las poliamidas preferibles son polihexametileno adipamida; y polihexametileno sebacamida. En general, el número promedio del peso
5 molécula del polímero usado para estas cerdas debe ser en exceso de 10,000 y preferiblemente de mayor de 30,000 para proporcionar la resistencia y tiesura necesarias en una cerda para cepillo de dientes. Las poliamidas comerciales preferibles incluyen nylon 6, nylon 6,6; nylon 6,10; y
10 nylon 6,12.

La patente de los Estados Unidos de América número 5,560,377 describe hacer hilo dental de un compuesto de un hilo de múltiples filamentos unidos a un
15 mono-filamento extrudido. Ambos elementos son hechos de compuestos de polímero, preferiblemente nylon, para proporcionar deseada facilidad de uso del mono-filamento como un líder para pasar al implemento fácilmente entre los dientes o bajo los puentes mientras que el hilo de
20 múltiples filamentos puede proporcionarse en incorporaciones dobladas, como un elemento de tubito o en forma de una o más colas por tanto proporcionando superior acción de uso de hilo dental cuando pasa entre los dientes o bajo los puentes.

25

La patente de los Estados Unidos de América número 6,604,534 describe cintas de mono-filamento y dispositivos interpróximos de monofilamento. La patente '534 describe las siguientes patentes como siendo
30 relevantes a los dispositivos de mono-filamento interpróximos: las patentes de los Estados Unidos de América números Re 35,439; 3,800,812; 4,974,615; 5,760,117; 5,433,226; 5,479,952; 5,503,842; 5,755,243;



5,845,652; 5,884,639; 5,918,609; 5,962,572; 5,998,431;
6,003,525; 6,083,208; 6,148,830; 6,161,555; y 6,027,592,
las descripciones de las cuales son aquí incorporadas por
referencia. Estas cintas dentales generalmente tienen
5 limitaciones serias en la gentileza, en suministrar
recubrimientos durante el paso del hilo dental y en ser
manejadas fácilmente y convenientemente durante el paso
del hilo dental.

10 La patente de los Estados Unidos de América
número 6,051,216 describe el uso de composiciones
cosméticas que contienen poliamidas con base de siloxanos
como agentes espesadores.

15

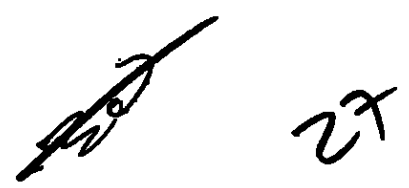
Síntesis de la Invención

20

Es un objeto de la presente invención el
desarrollar un nuevo material útil en la industria para
el cuidado oral.

25

Es otro objeto el desarrollar un nuevo
material útil como un filamento, preferiblemente un mono-
filamento o cerda usada en la industria para el cuidado
oral, en particular en un producto para el cuidado oral.
Un producto para el cuidado oral puede ser cualquier
30 producto conocido que es usado en la boca o para la boca.
Por ejemplo, un producto para el cuidado oral puede ser
pero no limitarse a, un cepillo de dientes, un cepillo
para pintar, cinta de hilo dental, tiras dentales o



aplicadores de tubo de cinta dental, etc. La cerda puede usarse para un cepillo de dientes que puede usarse en un cepillo de dientes manual no eléctrico o eléctrico que tiene propiedades superiores con respecto a sensoriales y antibactericidas

Otro objeto de la presente invención para desarrollar un nuevo material que puede usarse para pasar el hilo dental que tiene propiedades superiores con respecto a aspectos sensoriales y antibactericidas.

Otro objeto de la presente invención es el usar la cerda en un cepillo para pintar que puede usarse para aplicar composiciones de blanqueado a los dientes (blanquear los dientes) o una composición de limpieza a los dientes.

Un aspecto de la invención es un filamento que comprende un material de poliamida modificada de silicio mezclado con un diferente material de poliamida. El diferente material de poliamida puede ser el material comercial o del arte previo que es usado para el hilo dental o las cerdas del cepillo de dientes, tales como materiales descritos antes, que incluyen nylon. El filamento puede usarse en el hilo dental, cinta dental, o cerda de cepillo de dientes o una cerda para cepillo para pintar. El cepillo para pintar puede usarse en una aplicación para colocar una composición blanqueadora tal como una composición de blanqueado en los dientes para hacer los dientes más blancos.

Descripción Detallada de la Invención

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Se ha encontrado un nuevo material usado para hacer filamentos que pueden usarse en cualquier producto para el cuidado oral. El material puede usarse como un filamento tal como pero no limitado a, cepillos de dientes, hilo dental, cinta dental, y cepillos para pintar. Los cepillos para pintar pueden usarse para aplicar un blanqueador o cualquier otra composición a la boca y preferiblemente a los dientes. El filamento para cualquier producto comercial para el cuidado oral que contiene un filamento. El producto comercial para el cuidado oral puede hacerse de cualquier manera conocida.

Hemos encontrado que la incorporación de silicio en la poliamida resulta en nuevas propiedades físicas y químicas que modifican y mejoran el desempeño de las poliamidas. Los medios de modificación cambian la hidrofilia o la hidrofobia de las poliamidas o cambian la lubricación de las poliamidas. Mejoras también pueden introducirse por las funcionalidades acopladas a los silicios, que pueden exhibir propiedades antibactericidas o afinidad a ciertos iones de metal, iones de amonio cuaternario, iones de fluoruro o enzimas benéficas. Cambios en las propiedades físicas de las poliamidas incluyen el alterar la cristalinidad de las poliamidas, por ejemplo, reduciendo la cristalinidad de la poliamida por ejemplo, el nylon 6,6 a un nivel similar a aquel del nylon 6,12. Estas propiedades, cuando están presentes en las resinas de nylon pueden proporcionar beneficios superiores para hacer cerdas de cepillos de dientes e hilo dental.

Las poliamidas de silicio, contienen ambas mitades de silicio y mitades de amida en la columna. El

componente de silicio viene con una única flexibilidad, estabilidad, y propiedades de tensión de superficie, mientras que la mitad amida hace a la molécula compatible con otras poliamidas, tales como, las descritas en los
5 antecedentes de la invención que no están limitadas al nylon. Como se describió antes, poliamidas, tales como nylon son un material clave para la tecnología de cepillos de dientes y de hilo dental. Se concibe que la poliamida de silicio modificará la otra estructura de la
10 poliamida, tal como las estructuras de poliamida descritas antes en los antecedentes de la invención sección que incluye, estructura de nylon cuando se mezcla, y particularmente la estructura de superficie de la poliamida tal como el nylon de tal forma que la
15 poliamida modificada (por ejemplo, nylon) para cerdas y el hilo dental es más suave, y más lubricada. Esto puede proporcionar un significativo beneficio para reducir el trauma del cepillo de dientes al gingival, que es una mayor causa de recesión gingival. Más importante, es
20 también conocido que el silicio tiene tensión muy baja de superficie, y tal propiedad puede ser ideal para reducir adhesión bacterial y acumulación en las superficies de las cerdas de los cepillos de dientes (anti-acoplamiento), un efecto en pro de la higiene que puede
25 verse como deseable por el consumidor. Por lo tanto, las poliamidas modificadas de poliamida de silicio tales como, pero no limitadas a, nylon son materiales superiores para las cerdas del cepillo de dientes y el hilo dental.

30

Además, la química involucrada en el desarrollo de las poliamidas de silicio también puede usarse para injertar otros silicios tales como silicios

catiónicos o mitades de no silicio tales como iones de amonio cuaternario al nylon para lograr propiedades superiores deseadas para las cerdas del cepillo de dientes y el hilo dental. Las poliamidas de silicio
 5 usadas de conformidad con esta invención descritas en detalle en la patente de los Estados Unidos de América número 6,051,216, la cual es incorporada por referencia en su totalidad para todos los propósitos. La patente '216 reivindica una inclusión de poliamida modificada de
 10 silicio.

a) 0.5-80 por ciento por peso con base en el peso total de la composición de al menos una poliamida con base de siloxano;

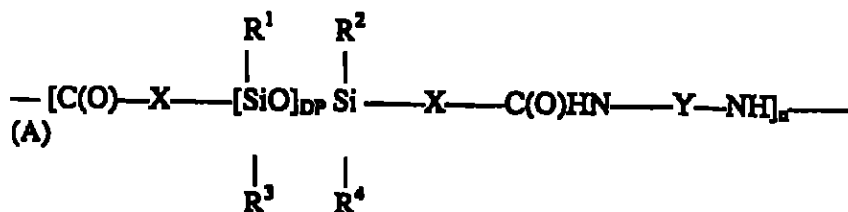
15

b) 5-95 por ciento por peso de fluido de silicio; y

c) si (a)+(b) no iguala a 100 por ciento, entonces una parte del solvente es suficiente para hacer
 20 100 por ciento, en donde:

la poliamida con base de siloxano es formada de unidades de la fórmula A:

25



donde: (1) n es un número seleccionado del

grupo que consiste de 1-500, donde n es el número de unidades en la poliamida;

(2) DP es un valor promedio para el grado de polimerización de una parte de siloxano de la poliamida y es seleccionado del grupo que consiste de 1-700;

(3) X es un alquileo de cadena lineal o ramificada que tiene 1-30 carbonos;

(4) cada R_1-R_4 es independientemente seleccionado del grupo que consiste de metil, etil, propil, isopropil, una cadena de siloxano, un fenil, en donde el fenil puede opcionalmente sustituirse por 1-3 miembros del grupo que consiste de metil y etil; y

(5) Y es seleccionado del grupo que consiste de alquilenos de cadena lineal o ramificada que tiene 1-40 carbonos, en donde el grupo alquileo mismo puede opcionalmente sustituirse por al menos un miembro seleccionado del grupo que consiste de:

(i) hidroxil;

25

(ii) C_3-C_8 cicloalcano;

(iii) miembros 1-3 seleccionados independientemente del grupo que consiste de C_1-C_3 alquilos; fenil opcionalmente sustituido por miembros 1-3 independientemente seleccionados del grupo que consiste de C_1-C_3 alquilos;

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(iv) C₁-C₃ alquilo hidroxil; y

(v) C₁-C₆ alquilo amina;

5 6 Y puede ser Z donde $Z=R^{20}T(R^{22})R^{21}$ donde
cada uno de R²⁰, R²¹, y R²² son independientemente
seleccionados del grupo que consiste de grupos alquilenos
o alquilo C₁-C₁₀ lineal o ramificado; y T es seleccionado
del grupo que consiste de CR, donde R es seleccionado del
10 grupo que consiste de hidrógeno, el grupo consistiendo
del grupo definido por R¹-R⁴; y un átomo trivalente
seleccionado del grupo que consiste de N, P y Al; y en
donde cada valor para X, Y, DP y R¹-R⁴ puede ser el mismo
o diferente para cada unidad en la poliamida. Además, la
15 poliamida con base de siloxano preferiblemente (1)
comprende de ambos grupos de siloxano y grupos amida para
espesar composiciones que contienen fluidos de silicio
(fluidos de silicio volátiles y/o no volátiles); (2) son
sólidos no fluidos a temperatura ambiente; y (3)
20 disuelven en un fluido que contiene silicio a una
temperatura de 25-160 grados centígrados, para formar una
solución translúcida o clara a una temperatura en este
rango.

25 Cuando se hace un cepillo de dientes, los
filamentos reposan en cercana proximidad unos a otros
como resultado del enrollado o trenzado de los
filamentos, o generalmente como resultado de torcer los
filamentos. El área de superficie de los filamentos puede
30 someterse a parcial disolución por medio de agentes
químicos. De esta manera, los filamentos se combinan
completamente juntos y son cerradas cualesquiera
cavidades que aún permanecen en el centro del enrollado o

~~9/1~~

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trenzado de la cerda. Este proceso puede soportarse por cualquier tensión de tracción existente o selectivamente variable que actúa en los filamentos. Completamente una cerda libre de cavidad es por tanto producida, ofreciendo
5 ninguna posibilidad e infiltración de bacterias o gérmenes.

Los siguientes valores han probado ser especialmente adecuados en particular para un cepillo de
10 dientes eléctrico: tres o cuatro filamentos por cerda son usados, el diámetro de los filamentos individuales descansan entre aproximadamente 0.0762 milímetros y 0.127 milímetros, aproximadamente, y el enrollado o trenzado de una cerda es repetido después de 1.0 milímetros
15 aproximadamente a 3.0 milímetros, aproximadamente.

Las cerdas pueden formarse por extrusión fundida de varios materiales poliméricos de termoplástico a través de apropiados orificios de extrusión en forma
20 apropiada en varias matrices siguiendo varios procesos tales como son descritos en las patentes de los Estados Unidos de América números 2,226,529 y 2,418,482; 3,745,061; 3,238,553; 3,595,952; 4,279,053; y la patente francesa número 2,125,920.

25

El colocado en penacho, cortado, engrapado etc., de las cerdas es realizado por procesos conocidos en el arte, por ejemplo como se describe en las patentes de los Estados Unidos de América números 4,441,227;
30 4,688,857; 979,782; 5,274,873; 5,335,389; y 5,511,275, las descripciones de las cuales son aquí incorporadas por referencia.

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Experimentos con mezclas de poliamidas de silicio y de poliamidas tales como nylon han indicado que dos polímeros son miscibles arriba de su temperatura de fundido, y son compatibles a macro-escala a temperatura de la habitación. La microscopía óptica fue empleada para demostrar que a micro-escala, el componente de silicio ocupa una específica fracción de volumen dentro de la resultante estructura terciaria de filamentos. Esto demuestra el papel del silicio como un modificador del nylon.

Los siguientes adicionales ejemplos fueron conducidos:

Lotes maestros con 20% de aditivo de poliamida en nylon 6,6 y nylon 6,12 fueron producidos. Los lotes maestros no contienen nada más. Los lotes maestros debieron producirse cuidadosamente para asegurar una buena dispersión del aditivo de bajo fundido en el nylon. Las fibras fueron producidas usando nylon 6,6 y nylon 6,12 para identificar correctas condiciones de procesamiento para ambos. En general, el nylon 6,6 fue procesado alrededor de 285-290 grados centígrados en la línea de fibra y el nylon 6,12 fue procesado alrededor de 235-240 grados centígrados. Las fibras fueron preparadas usando una matriz redonda que contiene 41 agujeros de matriz. Las fibras son "hilo plano" y son de 6-8 denier por filamento (250-325 denier total). Las fibras fueron entonces preparadas usando correctas proporciones de aflojamiento del lote maestro en apropiadas resinas. Los siguientes datos dan valores promedio de tracción y de datos de DSC.

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Fibras de nylon 6,6

Nivel aditivo (% por peso)	Tenacidad gramos /tex	Alargamiento al pico (%)	Alargamiento a rotura (%)	Cristalinidad (%)	Punto de fundido grados centígrado
0	17.64	353	359	26.6	265.3
1	14.84	429.4	599.8	27	265.9
3	17.01	217.1	392.1	22.2	266.8

5

Fibras de nylon 6,12

Nivel aditivo (% por peso)	Tenacidad gramos /tex	Alargamiento al pico (%)	Alargamiento a rotura (%)	Cristalinidad (%)	Punto de fundido grados centígrado
0	22.71	216.4	292.9	28	217.9
1	18.04	240.3	332.1	26.5	218.5
3	20.19	306.9	402.3	28.1	217.2

La tenacidad reportada es tenacidad de rompimiento.

10

Una comparación fue hecha entre mezcladas cerdas del cepillo de dientes con recubrimiento de poliamida de silicio en cerdas de nylon y cerdas con nylon no modificado. El nylon modificado mostró resultados mejorados no esperados.

15

Además, un ensayo microbiológico de acoplamiento bacterial a los cepillos de dientes fue realizado, y la tabla abajo presenta ejemplos que ilustran las propiedades nuevas y mejoradas antiacoplamiento bacteriales del nuevo material. Para evaluar la capacidad de las bacterias de acoplarse a la superficie de las cerdas del cepillo de dientes, fue diseñado un experimento para cuantificar el número de bacterias que fueron dejadas después de cierta cantidad de tiempo de enjuagado. Las bacterias escogidas para este

25

experimento fueron seleccionadas de las muchas especies relevantes orales. Una de tales especies adecuadas es la *Actinomyces naeslundii*, un colonizador bien conocido de la boca. Una suspensión bacteriana de la *A. naeslundii* fue
5 primero preparada al inocular cultivo de soya tripticasa (TSB). Después de la incubación toda la noche a 37.5 grados centígrados, la suspensión fue diluida con adicional cultivo de soya tripticasa (TSB) hasta que la densidad óptica (OD) fue de entre 0.015 y 0.2. (La
10 densidad óptica en este caso corresponde a la cantidad total de las bacterias en la suspensión). Los cepillos de dientes cuidadosamente fueron limpiados con detergente suave y entonces desinfectados por 60 segundos en 70% de etanol. Después de secado por aire, las cerdas de los
15 cepillos fueron sumergidas en la suspensión bacteriana por 60 segundos, enjuagadas en salina amortizada de fosfato (PBS) por 0-60 segundos, entonces cepilladas sobre la superficie de separadas placas de agar. Estas placas de agar fueron incubadas por dos días a 37.5 grados
20 centígrados en ese tiempo una inspección visual fue hecha de la colonia que forma unidades (CFU).

A más altas concentraciones de bacterias, >0.05 densidad óptica (OD), no fue posible contar las
25 confiables unidades de colonias (CFU). Sin embargo, en una inspección visual de estos experimentos siempre hubo claridad a menor densidad de las colonias bacteriales sobre la placa cepillada con las cerdas que contienen silicio. Conforme la carga bacteriana fue reducida a
30 densidad óptica (OD) de 0.017-0.020, dos de tres experimentos realizados mostraron una clara reducción de 18-25% en bacterias en los cepillos de dientes con nylon 6,6 + 3% de poliamida modificada de silicio, relativa al

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nylon 6,12.

Prueba	Material del cepillo de dientes		Reducción %
	Nylon 6,12 (CFU)	Nylon 6,6 con 3% de aditivo (CFU)	
1	290	387	25
2	980	1192	18

5 Todas las referencias descritas en esta aplicación son incorporadas por referencia en su totalidad para todos los propósitos útiles.

10 Aunque se mostraron y describieron ciertas estructuras específicas que incorporan la invención, será manifiesto para aquellos con habilidad en el arte que varias modificaciones y arreglos de las partes pueden hacerse sin apartarse del espíritu y del alcance del concepto subyacente de la invención y que la misma no
15 está limitada a las particulares formas aquí mostradas y descritas.



REIVINDICACIONES

1. Un material útil en productos para el cuidado oral el cual comprende una poliamida modificada
5 de silicio mezclada con un material de poliamida diferente.

2. El material tal y como se reivindica en la cláusula 1, caracterizado porque dicho material de
10 poliamida diferente es una poliamida sintética.

3. El material tal y como se reivindica en la cláusula 1, caracterizado porque dicho material de poliamida diferente es nylon 6, nylon 6,6; nylon 6,10 6
15 nylon 6,12.

4. El material tal y como se reivindica en la cláusula 1, caracterizado porque dicho material de poliamida diferente es nylon 6,6.
20

5. El material tal y como se reivindica en la cláusula 1, caracterizado porque dicha poliamida de base siloxano (1) comprende ambos grupos de siloxano y grupos amida para espesar las composiciones que contienen
25 fluidos de silicio (fluidos de silicio volátiles y/o no volátiles); (2) son sólidos no fluíbles a temperatura ambiente; y (3) se disuelven en un fluido el cual contiene silicio a una temperatura de 25-160AC, para formar una solución transparente o translúcida a una
30 temperatura en este rango.

6. El material tal y como se reivindica en la cláusula 1, caracterizado porque la poliamida

~~113~~ 39

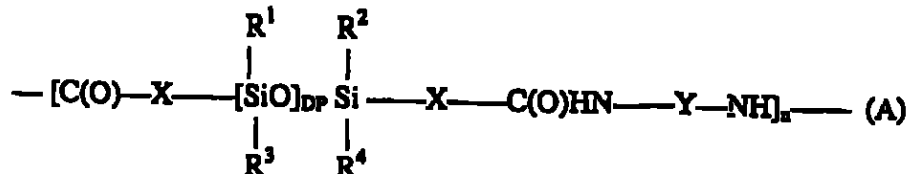
modificada de silicio comprende

5 a) de 0.5-80 por ciento por peso basado en el peso total de la composición de por lo menos una poliamida de base siloxano.

b) De 5-95 por ciento por peso de fluido de silicio;
y

10 c) Si (a)+(b) no son igual a 100 por ciento, entonces una parte de solvente suficiente para hacer 100 por ciento, en donde:

15 La poliamida de base siloxano está formada de unidades de la Fórmula A



20 En donde: (1) es un número seleccionado del grupo que consiste de 1-500, en donde n es el número de unidades en la poliamida;

25 (2) DP es un valor promedio para el grado de polimerización de una parte de siloxano de la poliamida y es seleccionado del grupo que consiste de 1-700;

(3) X es un alquileo de cadena recta o ramificada que tiene 1-30 carbonos;

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(4) cada uno de R^1-R^4 es seleccionado independientemente del grupo que consiste de metilo, etilo, propilo, isopropilo una cadena siloxano, y fenilo, en donde el fenilo puede ser sustituido opcionalmente por
5 miembros 1-3 del grupo que consiste de metilo y etilo; y

(5) Y es seleccionado del grupo que consiste de alquilemos de cadena recta o ramificada que tienen 1-40 carbonos, en donde el grupo alquilenos por si mismo puede
10 opcionalmente ser sustituido por al menos un miembro seleccionado del grupo que consiste de:

(i) hidroxil;

15 (ii) cicloalcano C_3-C_8 ;

(iii) 1-3 miembros seleccionados independientemente del grupo que consiste de alquilos C_1-C_3 ; fenilo opcionalmente sustituido por miembros
20 1-3 seleccionados independientemente del grupo que consiste de alquilos C_1-C_3 ;

(iv) Alquil hidroxil C_1-C_3 ;

25 (v) Alquil amina C_1-C_6 ;

6 Y puede ser Z en donde $Z=R^{20}T(R^{22})R^{21}$ en donde cada uno de R^{20} , R^{21} y R^{22} es seleccionado independientemente del grupo que consiste de alquilo C_1-C_{10} recto o ramificado o grupos alquilenos; y T es
30 seleccionado del grupo que consiste de CR, en donde R es seleccionado del grupo que consiste de hidrógeno, el grupo que consiste del grupo definido por R^1-R^4 y un

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átomo trivalente seleccionado del grupo que consiste de N, P y Al; y en donde cada valor para X, Y, DP y R¹-R⁴ puede ser el mismo o diferente para cada unidad en la poliamida.

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7. El material tal y como se reivindica en la cláusula 6, caracterizado porque dicho material de poliamida diferente es nylon 6, nylon 6,6; nylon 6,10 ó nylon 6,12.

10

8. El material tal y como se reivindica en la cláusula 6, caracterizado porque dicho material de poliamida diferente es nylon 6,6.

15

9. Un filamento el cual comprende el material tal y como se reivindica en la cláusula 1.

10. El filamento el cual comprende el material tal y como se reivindica en la cláusula 6.

20

11. Un producto para el cuidado oral el cual comprende por lo menos uno de dichos filamentos tal y como se reivindica en la cláusula 9.

25

12. El producto para el cuidado oral tal y como se reivindica en la cláusula 11, caracterizado porque el producto es un cepillo de dientes, hilo dental, cinta dental o brocha.

30

13. El hilo dental el cual comprende por lo menos uno de dichos filamentos tal y como se reivindica en la cláusula 9.

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14. Una cerda de cepillo de dientes que comprende por lo menos uno de dichos filamentos tal y como se reivindica en la cláusula 10.

5 15. Un cepillo de dientes que comprende por lo menos una cerda de cepillo de dientes tal y como se reivindica en la cláusula 13.

10 16. El cepillo de dientes tal y como se reivindica en la cláusula 15, caracterizado porque dicho cepillo de dientes en un cepillo de dientes eléctrico.

15 17. El cepillo de dientes tal y como se reivindica en la cláusula 15, caracterizado porque dicho cepillo de dientes un cepillo de dientes no eléctrico.

18. Un cepillo usado para blanquear los dientes el cual comprende por lo menos uno de dichos filamentos tal y como se reivindica en la cláusula 9.

20

19. Una cinta dental que comprende por lo menos uno de dichos filamentos tal y como se reivindica en la cláusula 9.

R E S U M E N

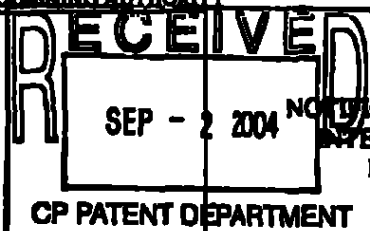
La invención está dirigida a un nuevo material útil en productos para el cuidado oral tal como
5 hilo dental o como una cerda para cepillo de dientes. El material es una poliamida modificada de silicio mezclada con un material de poliamida diferente. El material de poliamida diferente preferido es el material convencional usado para hacer cerdas de cepillos de dientes. El
10 material de poliamida diferente es preferiblemente un material de nylon.

2644 AS:96921

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
CLIFFORD E. WILKINS, JR.
COLGATE-PALMOLIVE COMPANY
909 RIVER ROAD
P.O. BOX 1343
PISCATAWAY, NJ 08855-1343



PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

Date of Mailing
(day/month/year)

30 AUG 2004

Applicant's or agent's file reference

IR 6844-01

IMPORTANT NOTIFICATION

International application No.

International filing date (day/month/year)

Priority date (day/month/year)

PCT/US03/33914

24 October 2003 (24.10.2003)

24 October 2002 (24.10.2002)

Applicant

COLGATE-PALMOLIVE COMPANY

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)). See also the reminder sent by the International Bureau with Form PCT/IB/301.

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US

Mail Stop PCT, Attn: IPEA/US
Commissioner for Patents
P.O. Box 1420
Alexandria, Virginia 22301-1420

Facsimile No. (703) 872-9316

Form PCT/IPEA/416 (July 1992)

Authorized officer

Frederick F. Kraus

Telephone No. (571) 372-1600

F. Roberts for

44 45

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference IR 6844-00	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US03/33914	International filing date (day/month/year) 24 October 2003 (24.10.2003)	Priority date (day/month/year) 24 October 2002 (24.10.2002)
International Patent Classification (IPC) or national classification and IPC IPC(7): A61K 6/00, 7/16 and US Cl.: 424/49, 50, 401, 404, 443; 433/80, 218, 217.1; 428/364, 480; 525/50, 66, 98, 166, 179, 322		
Applicant COLGATE-PALMOLIVE COMPANY		
1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet. ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 617 of the Administrative Instructions under the PCT). These annexes consist of a total of <u> </u> sheets.		
3. This report contains indications relating to the following items: I ☒ Basis of the report II ☐ Priority III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability IV ☐ Lack of unity of invention V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI ☐ Certain documents cited VII ☐ Certain defects in the international application VIII ☐ Certain observations on the international application		
Date of submission of the demand 24 May 2004 (24.05.2004)	Date of completion of this report 19 August 2004 (19.08.2004)	
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 872-9306	Authorized officer Frederick F. Kram <i>F. Roberts for</i> Telephone No. (571) 272-1600	

Form PCT/IPEA/409 (cover sheet) (July 1999)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US03/33914

1. Basis of the report

1. With regard to the elements of the international application:

- ☒ the international application as originally filed.
- ☒ the description:
 pages 1-11 as originally filed
 pages NONE filed with the demand
 pages NONE filed with the letter of _____
- ☒ the claims:
 pages 12-13 as originally filed
 pages NONE as amended (together with any statement) under Article 19
 pages NONE filed with the demand
 pages NONE filed with the letter of _____
- ☐ the drawings:
 pages NONE as originally filed
 pages NONE filed with the demand
 pages NONE filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages NONE as originally filed
 pages NONE filed with the demand
 pages NONE filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(h)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments. (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US03/33914

V. Reasoned statement under Rule 66.2(a)(II) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

I. STATEMENT

Novelty (N)	Claims 1-19	YES
	Claims NONE	NO
Inventive Step (IS)	Claims 1-19	YES
	Claims NONE	NO
Industrial Applicability (IA)	Claims 1-19	YES
	Claims NONE	NO

2. CITATIONS AND EXPLANATIONS

Claims 1-19 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest blends of a polyamide with a different silicon-modified polyamide, which are useful in oral care products such as mouthwash broths. As demonstrated by the information provided in the description at pages 10 and 11, oral care products made from the claimed blends, as compared to conventional nylon polyamides used to make oral care products in the prior art, unexpectedly provide improved antimicrobial activity.

Claims 1-19 meet the criteria set out in PCT Article 33(4); the applicability of the claimed oral care products to the oral care industry is self-evident.

TRATADO DE CO PERACIÓN DE PATENTES

Remitante:

OFICINA ENCARGADA DEL EXAMEN PRELIMINAR INTERNACIONAL

PCT

NOTIFICACION DE TRANSMISION DEL REPORTE DEL EXAMEN PRELIMINAR INTERNACIONAL

(Regla 71.1 PCT)

A:
CLIFFORD E. WILKINS, JR.
COLGATE-PALMOLIVE COMPANY
909 RIVER ROAD
CASILLA POSTAL 1343
PISCATAWAY, NJ 08855-1343

Fecha de envío
(Día/Mes/Año)

30 AGO 2004

No. de Expediente del Solicitante o Apoderado
IR 6844-00

COMUNICACIÓN IMPORTANTE

No. de Solicitud Internacional

Fecha Internacional de Presentación (día/mes/año)

Fecha de Prioridad (día/mes/año)

PCT/US03/33914

24 de Octubre de 2003 (24.10.2003)

24 de Octubre de 2002 (24.10.2002)

Solicitante

COLGATE-PALMOLIVE COMPANY

1. Se comunica al solicitante que la oficina encargada del examen preliminar internacional le envía con el presente el informe de examen preliminar internacional, elaborado para la solicitud internacional, en caso dado con los anexos correspondientes.
2. Una copia del informe, en caso dado con los anexos correspondientes, se hace llegar a la Oficina Internacional para su envío posterior a todas las oficinas seleccionadas.
3. A solicitud de una oficina seleccionada, la Oficina Internacional preparará una traducción del informe (pero no de los anexos) al inglés y la remitirá a esta oficina.
4. **RECORDATORIO**

Para ingresar en la fase nacional el solicitante, dentro de los 30 meses a partir de la fecha de prioridad (o en algunas oficinas incluso después), tiene que realizar ante cada oficina seleccionada ciertos actos (entrega de traducciones y desembolso de honorarios nacionales) (Artículo 39 (1)) (véase también la información remitida por la Oficina Internacional en el Formulario PCT/IB/301).

Si se tiene que enviar a una oficina seleccionada una traducción de la solicitud internacional, entonces esta traducción tiene que incluir traducciones de todos los anexos al informe de examen preliminar internacional. Es obligación del solicitante elaborar dichas traducciones y hacerlas llegar directamente a las oficinas seleccionadas respectivas.

Mayores detalles en cuanto a los plazos normativos y los requisitos de las oficinas seleccionadas se desprenden del Volumen II de la guía PCT para solicitantes.

Nombre y dirección postal del IPEA/US
Mail Stop PCT, Attn: IPEA/US
Comisionado de Patentes
P.O. Box 1450
Alexandria, Virginia 22313-1450
Facsimil No. (703)305-3230

Empleado Autorizado

Frederick F. Krass

Teléfono No. (571) 272-1600

Formulario PCT/IPEA/416 (Julio 1992)

53/49

**TRATADO SOBRE COOPERACIÓN INTERNACIONAL
EN MATERIA DE PATENTES**

PCT

**INFORME DE EXAMEN PRELIMINAR INTERNACIONAL
(Artículo 36 y Regla 70 PCT)**

No. de Expediente del Solicitante o Apoderado IR 8844-00	PROCEDIMIENTO POSTERIOR Véase comunicación sobre el envío del informe de examen preliminar internacional (Formulario PCT/IPEA/416)	
No. Solicitud Internacional PCT/US03/33914	Fecha Internacional de Presentación (día/mes/año) 24 de Octubre de 2003 (24.10.2003)	Fecha de Prioridad (día/mes/año) 24 de Octubre de 2002 (24.10.2002)
Clasificación Internacional de Patente (IPC) o Clasificación Nacional e IPC IPC(7): 61k 6/00, 7/16 y US Cl.: 424/49, 50, 401, 404, 443; 433/80, 216, 217.1; 428/384, 480; 525/50, 66, 98, 166, 179, 222		
Solicitante COLGATE-PALMOLIVE COMPANY		

1. Este informe de examen preliminar internacional fue elaborado por la Oficina Encargada del Examen Preliminar Internacional y se envía al solicitante según Artículo 36.
2. Este INFORME comprende un total de 3 hojas, incluye esta portada
- ☐ Además se adjuntan ANEXOS al informe; en este caso se trata de hojas con descripciones, reivindicaciones y/o dibujos, que se modificaron y que sirven de base a este informe, y/o hojas con correcciones efectuadas por esta oficina (véase Regla 70.16 y Sección 807 de las instrucciones administrativas al PCT).
- Estos anexos comprenden en total de hojas.

3. Este informe contiene datos con respecto a los siguientes puntos:
- | | | |
|------|-------------------------------------|---|
| I | ☒ | Base del Informe |
| II | ☐ | Prioridad |
| III | ☐ | Sin elaboración de un dictamen sobre novedad, actividad inventiva y posibilidad de aplicación industrial |
| IV | ☐ | Uniformidad deficiente de la invención |
| V | ☒ | Declaración justificada según Artículo 35(2) con respecto a la novedad, la actividad inventiva y la posibilidad de aplicación industrial; documentos y explicaciones que sustentan esta declaración |
| VI | ☐ | Ciertos documentos enumerados |
| VII | ☐ | Ciertas deficiencias del registro internacional |
| VIII | ☐ | Ciertas observaciones relacionadas con la solicitud internacional |

Fecha de presentación de la petición 24 de Mayo de 2004 (24.05.2004)	Fecha de la preparación de este informe 19 de Agosto de 2004 (19.08.2004)
Nombre y dirección postal de la IPEA/US Mail Stop PCT, Attn: IPEA/US Comisionado de Patentes P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimil No. (703)305-3230	Empleado Autorizado Frederick F. Krass Teléfono (571) 272-1800

INFORME DEL EXAMEN PRELIMINAR INTERNACIONAL

Solicitud Internacional No.
PCT/US03/33814

I. Bases para este reporte.

1. Respecto a los elementos de la solicitud internacional:*

- ☒ la solicitud internacional como se entregó originalmente
- ☒ la descripción:
páginas 1 - 11 como se entregaron originalmente
páginas NINGUNA como se entregaron con la demanda
páginas NINGUNA como se entregaron con la carta de _____
- ☒ las reivindicaciones:
páginas 12 - 15 como se entregaron originalmente
páginas NINGUNA como se corrigieron (junto con cualquier declaración) bajo el Artículo 19
páginas NINGUNA como se entregaron con la demanda
páginas NINGUNA como se entregaron con la carta de _____
- ☐ los dibujos
páginas NINGUNA como se entregaron originalmente
páginas NINGUNA como se entregaron con la demanda
páginas NINGUNA como se entregaron con la carta de _____
- ☐ la lista de la descripción
páginas NINGUNA como se entregaron originalmente
páginas NINGUNA como se entregaron con la demanda
páginas NINGUNA como se entregaron con la carta de _____

2. Respecto al idioma, todos los elementos anteriormente marcados estaban disponibles o fueron suministrados a esta oficina en el idioma en el que se entregó la solicitud internacional, a menos que se diga lo contrario en este punto. Estos elementos estaban disponibles o fueron entregados a esta oficina en el siguiente idioma _____ los cuales son

- ☐ El idioma de la traducción entregada para propósitos de la búsqueda internacional (Regla 23.1 (b)).
- ☐ El idioma de publicación de la solicitud internacional (bajo la Regla 48.3 (b)).
- ☐ El idioma de la traducción entregada para propósitos del examen preliminar internacional (bajo las Reglas 55.2 y/o 55.3)

3. respecto a cualquier secuencia de nucleótido y/o aminoácidos divulgados en esta solicitud internacional, el examen preliminar internacional se realizó sobre la base de la secuencia:

- ☐ contenida en la solicitud en forma impresa
- ☐ entregada junto con la solicitud internacional en una forma legible en un computador
- ☐ suministrada subsecuentemente a esta oficina de forma escrita
- ☐ suministrada subsecuentemente a esta oficina en forma legible en un computador
- ☐ la declaración que la secuencia escrita suministrada no va más allá de lo divulgado en la solicitud internacional como se entregó ha sido suministrada
- ☐ La declaración que la información registrada en la forma legible a computador es idéntica a la secuencia escrita ha sido suministrada.

4. ☐ Las correcciones han resultado en la cancelación de:

- ☐ la descripción, páginas NINGUNA
- ☐ las reivindicaciones, Nos. NINGUNA
- ☐ los dibujos, hojas/figuras NINGUNA

- 5 ☐ Este Informe ha sido admitido como si (algunas de) las enmendaduras no hubieran sido hechas, ya que se considera que estas van más allá de la divulgación preliminar, como se indica el Apartado Suplementario (Regla 70.2 (c)). **
* Las hojas de reemplazo que han sido suministradas a la Oficina receptora en respuesta a una invitación bajo el Artículo 14 se mencionan en este Informe como "entregadas originalmente" y no se anexan a este Informe ya que no contienen enmendaduras (Reglas 70.16 y 70.17)
** Cualquier hoja de reemplazo que contiene tales enmiendas debe mencionarse bajo el asunto 1 de este Informe.

INFORME DEL EXAMEN PRELIMINAR INTERNACIONAL

No de Solicitud Internacional
PCT/US03/33914

V. Declaración concluyente de acuerdo a la Regla 66.2 (a)(ii) con relación a la novedad, el nivel inventivo o la aplicabilidad industrial; citas y explicaciones que soportan tal declaración

1. DECLARACIÓN

Novedad (N)	Reivindicaciones <u>1 - 19</u>	Si
	Reivindicaciones <u>NINGUNA</u>	No
Nivel Inventivo (IS)	Reivindicaciones <u>1 - 19</u>	Si
	Reivindicaciones <u>NINGUNA</u>	No
Aplicabilidad Industrial (IA)	Reivindicaciones <u>1 - 19</u>	Si
	Reivindicaciones <u>NINGUNA</u>	No

2. CITAS Y EXPLICACIONES

Las reivindicaciones 1 - 19 cumplen los criterios establecidos en el Artículo 33(2) - (3) del PCT, porque el arte previo no enseña o siquiera sugiere mezclas de una poliamida con una poliamida modificada con sílica diferente, las cuales son útiles en productos para el cuidado oral tal como cerdas de cepillos de dientes. Como se demuestra por la información proporcionada en la descripción en las páginas 10 y 11, los productos para el cuidado oral hechos a partir de las mezclas reivindicadas, comparados con las poliamidas de nylon convencionales usadas para hacer productos para el cuidado oral en el arte previo, inesperadamente proporcionan actividad antibacterial mejorada.

Las reivindicaciones 1 - 19 cumplen los criterios establecidos en el Artículo 33(4) del PCT; la aplicabilidad de los productos para el cuidado oral reivindicados a la industria del cuidado oral es evidente por el mismo.

———— NUEVAS CITAS —————

TRANSMITTAL LETTER TO THE
UNITED STATES RECEIVING OFFICE

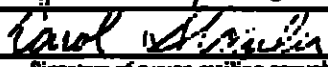
Date	24 October 2003
International Application No.	
Attorney Docket No.	IR 8844-00

I. Certification under 37 CFR 1.10 (If applicable)

EV 359990538 US
Express Mail mailing number

24 October 2003
Date of Deposit

I hereby certify that the application/correspondence attached hereto is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Assistant Commissioner for Patents, Washington, D.C. 20231.


Signature of person mailing correspondence

Carol Stanley
Typed or printed name of person mailing correspondence

II. ☒ New International Application

TITLE	SILICON MODIFIED POLYAMIDE MATERIAL USEFUL FOR ORAL CARE
-------	--

Earliest priority date (Day/Month/Year)
24 October 2002

SCREENING DISCLOSURE INFORMATION: In order to assist in screening the accompanying international application for purposes of determining whether a license for foreign transmittal should and could be granted and for other purposes, the following information is supplied. (Note: check as many boxes as apply):

- A. ☐ The invention disclosed was not made in the United States.
- B. ☐ There is no prior U.S. application relating to this invention.
- C. ☒ The following prior U.S. application(s) contain subject matter which is related to the invention disclosed in the attached international application. (NOTE: priority to these applications may or may not be claimed on form PCT/RO/101 (Request) and this listing does not constitute a claim for priority).

application no.	USN 60/421,037	filed on	24 October 2002
application no.		filed on	

- D. ☐ The present international application ☐ is identical ☐ contains less subject matter than that found in the prior U.S. application(s) identified in paragraph C.
- E. ☒ The present international application ☒ contains additional subject matter not found in the prior U.S. application(s) identified in paragraph C. above. The additional subject matter is found on pages and ☒ DOES NOT ALTER ☐ MIGHT BE CONSIDERED TO ALTER the general nature of the invention in a manner which would require the U.S. application to have been made available for inspection by the appropriate defense agencies under 35 U.S.C. 181 and 37 CFR 5.1. See 37 CFR 5.15

III. ☐ A Response to an Invitation from the RCMUS. The following document(s) is (are) enclosed:

- A. ☐ A Request for An Extension of Time to File a Response
- B. ☐ A Power of Attorney (General or Regular)
- C. ☐ Replacement pages:

pages		of the request (PCT/RO/101)	pages		of the figures
pages		of the description	pages		of the abstract
pages		of the claims			

- D. ☐ Submission of Priority Documents

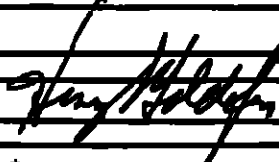
Priority document		Priority document	
-------------------	--	-------------------	--

- E. ☐ Fees as specified on attached Fee Calculation sheet form PCT/RO/101 annex

IV. ☐ A Request for Rectification under PCT 91 ☐ A Petition ☐ A Sequence Listing Diskette

V. ☐ Other (please specify):

The person signing this form is the:

☐ Applicant		Henry S. Goldfine
☒ Attorney/Agent (Reg. No.) 38,488		Typed name of signer
☐ Common Representative		Signature

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PCT REQUEST

6844-00

Original (for SUBMISSION) - printed on 24.10.2003 02:58:52 PM

0	For receiving Office use only	
0-1	International Application No.	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	
0-4	Form - PCT/RO/101 PCT Request	
0-4-1	Prepared using	PCT-EASY Version 2.92 (updated 01.07.2003)
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	United States Patent and Trademark Office (USPTO) (RO/US)
0-7	Applicant's or agent's file reference	6844-00
I	Title of invention	SILICON MODIFIED POLYAMIDE MATERIAL USEFUL FOR ORAL CARE
II	Applicant	
II-1	This person is:	applicant only
II-2	Applicant for	all designated States except US
II-4	Name	COLGATE-PALMOLIVE COMPANY
II-5	Address:	300 Park Avenue New York, NY 10022 United States of America
II-6	State of nationality	US
II-7	State of residence	US
II-8	Telephone No.	732-878-6250
II-9	Facsimile No.	732-878-7853
III-1	Applicant and/or inventor	
III-1-1	This person is:	applicant only
III-1-2	Applicant for	all designated States except US
III-1-4	Name	DOW CORNING CORPORATION
III-1-5	Address:	2200 West Salzburg Road Midland, MS 48686 United States of America
III-1-6	State of nationality	US
III-1-7	State of residence	US

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PCT REQUEST

6844-00

Original (for SUBMISSION) - printed on 24.10.2003 02:58:52 PM

III-2	Applicant and/or Inventor	
III-2-1	This person is:	applicant and inventor
III-2-2	Applicant for	US only
III-2-4	Name (LAST, First)	CAI, Heng
III-2-5	Address:	1659 Covington Road Yardley, PA 19067 United States of America
III-2-6	State of nationality	US
III-2-7	State of residence	US
III-3	Applicant and/or Inventor	
III-3-1	This person is:	applicant and inventor
III-3-2	Applicant for	US only
III-3-4	Name (LAST, First)	HOLERCA, Marian, N.
III-3-5	Address:	117 Benner Street Highland Park, NJ 08904 United States of America
III-3-6	State of nationality	RO
III-3-7	State of residence	US
III-4	Applicant and/or Inventor	
III-4-1	This person is:	applicant and inventor
III-4-2	Applicant for	US only
III-4-4	Name (LAST, First)	CHEN, Albert, C.
III-4-5	Address:	14 Vaux Hall Road East Brunswick, NJ 08816 United States of America
III-4-6	State of nationality	US
III-4-7	State of residence	US
III-5	Applicant and/or Inventor	
III-5-1	This person is:	applicant and inventor
III-5-2	Applicant for	US only
III-5-4	Name (LAST, First)	CANADY, Van
III-5-5	Address:	1085 Cherry Hill Road Princeton, NJ 08540 United States of America
III-5-6	State of nationality	US
III-5-7	State of residence	US
III-6	Applicant and/or Inventor	
III-6-1	This person is:	applicant and inventor
III-6-2	Applicant for	US only
III-6-4	Name (LAST, First)	AFFLITTO, John
III-6-5	Address:	2 Jay Drive Brookside, NJ 07926 United States of America
III-6-6	State of nationality	US
III-6-7	State of residence	US

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PCT REQUEST

6844-00

Original (for SUBMISSION) - printed on 24.10.2003 02:58:52 PM

III-7	Applicant and/or inventor	
III-7-1	This person is:	applicant and inventor
III-7-2	Applicant for	US only
III-7-4	Name (LAST, First)	FANTANO, Steven, L.
III-7-5	Address:	48 Russling Road Hackettstown, NJ 40840 United States of America
III-7-6	State of nationality	US
III-7-7	State of residence	US
III-8	Applicant and/or inventor	
III-8-1	This person is:	applicant and inventor
III-8-2	Applicant for	US only
III-8-4	Name (LAST, First)	RYAN, Kevin, J.
III-8-5	Address:	2710 Longfellow Lane Midland, MI 48640 United States of America
III-8-6	State of nationality	US
III-8-7	State of residence	US
IV-1	Agent or common representative; or address for correspondence The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	agent
IV-1-1	Name (LAST, First)	GOLDFINE, Henry, S.
IV-1-2	Address:	Colgate-Palmolive Company 909 River Road P.O. Box 1343 Piscataway, NJ 08855-1343 United States of America
IV-1-3	Telephone No.	732-878-6250
IV-1-4	Facsimile No.	732-878-7853
IV-1-5	e-mail	henry_goldfine@colpal.com

PCT REQUEST

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6944-00

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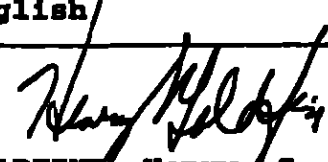
V	Designation of States	
V-1	Regional Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AP: GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW and any other State which is a Contracting State of the Harare Protocol and of the PCT EA: AM AZ BY KG KZ MD RU TJ TM and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT EP: AT BE BG CH&LI CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PT RO SE SI SK TR and any other State which is a Contracting State of the European Patent Convention and of the PCT OA: BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG and any other State which is a member State of OAPI and a Contracting State of the PCT
V-2	National Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH&LI CN CO CR CU CZ DE DK DM DZ EC EE EG ES FI GB GD GE GH GN HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NZ NI NO NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW
V-3	Precautionary Designation Statement In addition to the designations made under items V-1, V-2 and V-3, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except any designation(s) of the State(s) indicated under item V-3 below. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit.	
V-4	Exclusion(s) from precautionary designations	NONE
VI-1	Priority claim of earlier national application	
VI-1-1	Filing date	24 October 2002 (24.10.2002)
VI-1-2	Number	60/421,037
VI-1-3	Country	US

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PCT REQUEST

6844-00

Original (for SUBMISSION) - printed on 24.10.2003 02:58:52 PM

VI-2	Priority document request The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s):	VI-1	
VII-1	International Searching Authority Chosen	United States Patent and Trademark Office (USPTO) (ISA/US)	
VIII	Declarations	Number of declarations	
VIII-1	Declaration as to the identity of the inventor	-	
VIII-2	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	-	
VIII-3	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	-	
VIII-4	Declaration of inventorship (only for the purposes of the designation of the United States of America)	-	
VIII-5	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	-	
IX	Check list	number of sheets	electronic file(s) attached
IX-1	Request (including declaration sheets)	6	-
IX-2	Description	11	-
IX-3	Claims	4	-
IX-4	Abstract	1	EZABST00.TXT
IX-5	Drawings	0	-
IX-7	TOTAL	22	
	Accompanying items	paper document(s) attached	electronic file(s) attached
IX-8	Fee calculation sheet	✓	-
IX-17	PCT-EASY diskette	-	Diskette
IX-19	Figure of the drawings which should accompany the abstract		
IX-20	Language of filing of the international application	English	
X-1	Signature of applicant, agent or common representative		
X-1-1	Name (LAST, First)	GOLDFINE, Henry S.	

FOR RECEIVING OFFICE USE ONLY

10-1	Date of actual receipt of the purported international application	
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	

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PCT REQUEST

6844-00

Original (for SUBMISSION) - printed on 24.10.2003 02:58:52 PM

10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/US
10-6	Transmittal of search copy delayed until search fee is paid	

FOR INTERNATIONAL BUREAU USE ONLY

11-1	Date of receipt of the record copy by the International Bureau	
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SILICON MODIFIED POLYAMIDE MATERIAL USEFUL FOR ORAL CARE

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Background of the Invention

The invention is drawn to a novel silicon modified polyamide material that is useful in the oral care field. For example, the material can be used as filaments that can be used as toothbrush bristles, interdental brushes, paint brush bristles such as for a cleaning or whitening system, dental floss tape (string), dental strips or tube applicators etc.

Several patents describe bristles of tooth brushes. For example, US 6,327,736 discloses making bristles for a toothbrush from a plastic material chosen from a group of plastics consisting of polyamides and polyesters. Polyamides include nylon. Other patents that discuss making bristles and/or dental floss are US 6,475,553

15 Manufacturers of nylon bristle toothbrushes have provided in the past, a variety of toothbrushes designated as "soft," "medium," and/or "hard" to indicate the stiffness of the bristles. For a given thermoplastic polymeric composition, one factor, which predominantly determines bristle stiffness, is the diameter of the individual bristles. For example, with nylon 6,12 the "soft" bristles typically have a diameter between 0.007 and 0.008 inches; "medium" bristles have a diameter between 0.008 and 0.009 inches and "hard" bristles have a diameter greater than about 0.010 inches. Polybutylene terephthalate bristles are typically about 0.001 to 0.002 inches smaller in diameter due to the greater wet stiffness of this material over that of nylon 6.12. For all bristles used in toothbrushes, there is generally a manufacturing or grading tolerance of about +/- 0.0005 inches.

25 Soft, medium, and hard bristles are all effective in cleaning teeth while soft bristles are more gentle on the gum and soft tissues of the oral cavity, medium and hard bristles show stronger brushing actions on the tooth surfaces.

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US 6.138,314 discloses making bristles for a toothbrush from polyamide materials such as nylon materials. The synthetic polyamides useful in the bristles of toothbrushes includes those which are of sufficient molecular weight to be fiber-forming such as: polycaprolactam, polyhexamethylene adipamide, polyhexamethylene sebacamide, the
5 polyamide formed from 1.4,(cis)cyclohexane-bis(methylamine) and adipic acid (see U.S. Pat. No. 3.012,994); the polyamide from m-xylene diamine and adipic acid (see U.S. Pat. No. 2.916,475); the polyamide from 3.5 dimethyl hexamethylene diamine and terephthalic acid (see U.S. Pat. No. 2.752.358); the polyamide from 2.5 dimethyl piperazine and adipyl chloride (see U.S. Pat. No. 3.143.527). See also U.S. Pat. No. 2,152.606. The preferred
10 polyamides are polyhexamethylene adipamide; and polyhexamethylene sebacamide. In general, the number average molecular weight of the polymer used for these bristles should be in excess of 10,000 and preferably greater than 30,000 to provide the strength and stiffness needed in a toothbrush bristle. The commercial polyamides preferred include nylon 6, nylon 6,6; nylon 6,10 and nylon 6,12.

15 US 5.560,377 discloses making dental floss from a composite of a multifilament yarn bonded to an extruded monofilament. Both elements are made of polymer compounds, preferably nylon, to provide desired ease of use of the monofilament as a leader to pass the implement easily between the teeth or under bridges while the multifilament yarn can be provided in looped embodiments, as a bush element or in the
20 form of one or more tails thus providing superior flossing action when passed between the teeth or under bridges.

US Pat. No. 6.604.534 (" '534 patent"). discusses monofilament tapes and monofilament interproximal devices. The '534 patent discusses the following patents as being relevant to monofilament interproximal devices: U.S. Pat. Nos. Re 35,439;
25 3.800,812; 4.974.615; 5.760,117; 5.433.226; 5.479,952; 5.503,842; 5.755,243; 5.845,652;

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61

5.884.639; 5.918.609; 5.962.572; 5.998.431; 6.003.525; 6.083.208; 6.148.830; 6.161.555;
and 6,027.592, the disclosures of which are hereby incorporated herein by reference.

These dental tapes generally have serious shortcomings in gentleness in delivering
coatings during flossing and in being handled easily and conveniently during flossing.

5 U.S. 6,051,216 discloses the use of cosmetic compositions containing siloxane
based polyamides as thickening agents.

SUMMARY OF THE INVENTION

It is an object of the present invention to develop a new material useful in the oral
care industry.

10 It is another object to develop a new material useful as a filament, preferably a
monofilament or bristle used in the oral care industry, in particular in an oral care product.
An oral care product would be any known product that is used in the mouth or for the
mouth. For example, an oral care product can be but is not limited to a toothbrush,
paintbrush, dental floss tape (string), dental strips or tube applicators dental tape etc. The
15 bristle can be used for a toothbrush that can be used on a manual non-electric or electric
toothbrush that has superior properties with respect to sensory and antibacterial.

Another object of the present invention to develop a new material that can be used
for dental floss that has superior properties with respect to sensory and antibacterial.

Another object of the present invention is to use the bristle on a paint brush that
20 can be used to apply whitening compositions to the teeth (bleaching the teeth) or a
cleaning composition to the teeth.

One aspect of the invention is a filament which comprises a silicon-modified
polyamide material blended with a different polyamide material. The different polyamide
material can be the commercial or prior art material that is used for dental floss or
25 toothbrush bristles, such as the materials discussed above, which include nylon. The

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filament can be used in dental floss, dental tape, a toothbrush bristle or a paint brush bristle. The paint brush can be used in an application to place a whitening composition such as a bleaching composition on the teeth to make the teeth whiter.

DETAILED DESCRIPTION OF THE INVENTION

5 We have found a new material used for making filaments that can be used in any oral care product. The material can be used as a filament such as but not limited to tooth brushes, dental floss, dental tape, and paint brushes. The paint brushes can be used to apply a cleaning, whitening or any other composition to the mouth and preferably the teeth. The filament can be substituted for any commercial oral care product that contains a
10 filament. The commercial oral care product would be made in any known manner.

 We have found that the incorporation of silicone into polyamides results in new physical and chemical properties that modify and improve the performance of the polyamides. The modification means changing the hydrophilicity or hydrophobicity of the polyamides or changing the lubricity of the polyamides. Improvements can also be
15 introduced by the functionalities attached to the silicones, which can exhibit antibacterial properties or affinity for certain metal ions, quaternary ammonium ions, fluoride ions or beneficial enzymes. Changes in the physical properties of polyamides include altering the crystallinity of polyamides, for example, reducing the crystallinity of the polyamide for example, Nylon 6.6 to a level similar to that of Nylon 6.12. These properties, when
20 present in nylon resins can provide superior benefits for making toothbrush bristles and dental floss.

 Siliconized polyamides, contain both silicone moieties and amide moieties in the backbone. The silicone component comes with unique flexibility, stability and surface tension properties, while the amide moieties make the molecule compatible with other
25 polyamides, such as, the ones described in the background of the invention which are not

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limited to nylon. As discussed above, polyamides, such as nylon are a key material for toothbrush and dental floss technology. It is conceived that the siliconized polyamide will modify the other polyamide structure, such as the polyamide structures discussed above in the background of the invention section which includes, nylon structure when mixed, and particularly the surface structure of the polyamide such as nylon so that the modified polyamide (i.e. nylon) for bristles and dental floss are softer, and more lubricious. This would provide a significant benefit to reduce toothbrush trauma to the gingival, which is a major cause of gingival recession. More importantly, it is also known that silicone has very low surface tension, and such a property would be ideal for reducing bacterial adhesion and accumulation on the surfaces of toothbrush bristles (anti-attachment), a pro-hygenic effect which would be viewed as desirable by the consumer. Therefore, siliconized polyamide modified polyamides such as, but not limited to nylons are superior materials for toothbrush bristle and dental floss.

In addition, the chemistry involved in developing siliconized polyamides can also be used to graft other silicones such as cationic silicones or non-silicone moieties such as quaternary ammonium ions to nylon to achieve superior properties desired for toothbrush bristles and dental floss. Siliconized polyamides used according to this invention described in detail in US patent No. 6,051,216 (" '216 patent") which is incorporated by reference in its entirety for all useful purposes. The '216 patent claims a silicon-modified polyamide comprises

a) 0.5-80 percent by weight based on the total weight of the composition of at least one siloxane-based polyamide;

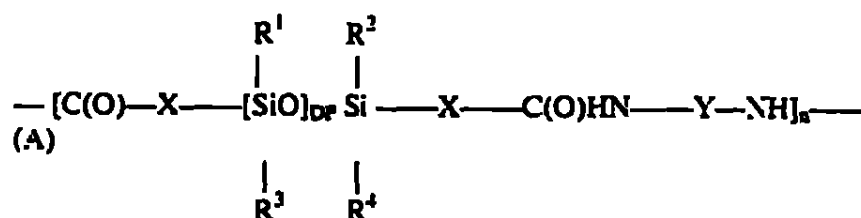
(b) 5-95 percent by weight silicone fluid; and

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(c) if (a)+(b) do not equal 100 percent, then a portion of solvent sufficient to make 100 percent, wherein:

the siloxane-based polyamide is formed from units of Formula A



where: (1) n is a number selected from the group consisting of 1-500, where n is the number of units in the polyamide:

15

(2) DP is an average value for degree of polymerization of a siloxane portion of the polyamide and is selected from the group consisting of 1-700:

(3) X is a linear or branched chain alkylene having 1-30 carbons:

20

(4) each of R^1 - R^4 is independently selected from the group consisting of methyl, ethyl, propyl, isopropyl, a siloxane chain, and phenyl, wherein the phenyl may optionally be substituted by 1-3 members from the group consisting of methyl and ethyl; and

25

(5) Y is selected from the group consisting of linear or branched chain alkenes having 1-40 carbons, wherein the alkylene group itself may optionally be substituted by at least one member selected from the group consisting of

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(i) hydroxy;

(ii) C₃-C₈ cycloalkane;

5

(iii) 1-3 members selected independently from the group consisting of C₁-C₃ alkyls: phenyl optionally substituted by 1-3 members independently selected from the group consisting of C₁-C₃ alkyls;

10

(iv) C₁-C₃ alkyl hydroxy; and

(v) C₁-C₈ alkyl amine;

15

or Y may be Z where $Z = R^{20} T(R^{21}) R^{22}$ where each of R²⁰, R²¹ and R²² is independently selected from the group consisting of linear and branched C₁-C₁₀ alkyl or alkylene groups: and T is selected from the group consisting of CR, where R is selected from the group consisting of hydrogen, the group consisting of the group defined for R¹-R⁴: and a trivalent atom selected from the group consisting of N, P and Al; and wherein each value for X, Y, DP and R¹-R⁴ may be the same

20

or different for each unit in the polyamide. In addition, the siloxane-based polyamide preferably (1) comprise both siloxane groups and amide groups to thicken compositions containing silicone fluids (volatile and/or non-volatile silicone fluids): (2) are non-flowable solids at room temperature: and (3) dissolve in a fluid which contains silicone at a temperature of 25-160 degrees C. to form a translucent or clear solution at a temperature in this range.

25

When making a toothbrush, the filaments lie in close proximity to each other as the result of winding or braiding the filaments, or generally as the result of stranding the filaments. The surface area of the filaments can be subjected to partial dissolving by means of chemical agents. In this manner, the filaments merge completely together and
5 any cavities still remaining in the center of the wound or braided bristle are closed. This process can be supported by any existing or selectively variable tensile stress acting on the filaments. Altogether a cavity-free bristle is thus produced, offering bacteria or other germs no possibility of infiltration.

The following values have proven to be especially suitable in particular for an
10 electric toothbrush: three or four filaments per bristle are used, the diameter of the individual filaments lies between approximately 0.0762 mm and 0.127 mm, approximately, and the winding or braiding of a bristle is repeated after every 1.0 mm approximately to 3.0 mm, approximately.

The bristles may be formed by melt extruding various thermoplastic polymeric
15 materials through appropriately shaped extrusion orifices in various dies following various processes such as described in U.S. Pat. Nos. 2,226,529 and 2,418,482; 3,745,061; 3,238,553; 3,595,952; 4,279,053; and French Patent No. 2,125,920.

The tufting, cutting, stapling, etc., of the bristles is performed by processes known in the art: for instance as described in U.S. Pat. Nos. 4,441,227; 4,688,857; 979,782;
20 5,274,873; 5,335,389; and 5,511,275, the disclosures of which are hereby incorporated herein by reference.

Experiments with blends of siliconized polyamides and polyamides such as nylon have indicated that the two polymers are miscible above their melting temperature, and they are compatible at the macro-scale at room temperature. Optical microscopy was
25 employed to demonstrate that at the micro-scale, the silicone component occupies a

2X 67

specific volume fraction within the resulting tertiary structure of filaments. This demonstrated the role of silicone as a modifier of nylon.

The following additional examples were conducted:

Masterbatches with 20% polyamide additive in Nylon 6,6 and Nylon 6,12 were produced. The masterbatches did not contain anything else. Masterbatches had to be produced carefully to ensure a good dispersion of the low-melting additive in the Nylons. Fibers were produced using Nylon 6.6 and Nylon 6.12 to identify correct processing conditions for both. In general Nylon 6.6 was processed around 285-290°C in the fiber line and Nylon 6.12 was processed around 235-240°C. Fibers were prepared using a round die containing 41 die holes. Fibers are "flat yarn" and are 6-8 denier per filament (250-325 total denier). Fibers were then prepared using correct letdown ratios of the masterbatch in appropriate resins. The following data gives average values from tensile and DSC data.

Nylon 6,6 fibers

Additive level (%w/w)	Tenacity* grams/tex	Elongation at peak (%)	Elongation at break (%)	Crystallinity (%)	Melting point deg. C
0	17.64	353	359	26.6	265.3
1	14.84	429.4	599.8	27	265.9
3	17.01	217.1	392.1	22.2	266.8

Nylon 6, 12 fibers

Additive level (%w/w)	Tenacity* grams/tex	Elongation at peak (%)	Elongation at break (%)	Crystallinity (%)	Melting point deg. C
0	22.71	216.4	292.9	28	217.9
1	18.04	240.3	332.1	26.5	218.5
3	20.19	306.9	402.3	28.1	217.2

Tenacity reported is breaking tenacity

A comparison was made between mixed toothbrush bristles with siliconized polyamide coated on nylon bristles and bristles with unmodified nylon. The modified nylon showed unexpectedly improved results.

In addition, a microbiological assay of bacterial attachment to toothbrushes was performed, and the table below presents examples illustrating the new and improved bacterial anti-attachment properties of the new material. To evaluate the ability of bacteria to attach to the surface of the toothbrush bristles, an experiment was designed to quantify the number of bacteria which were left after a certain amount of rinsing time. Bacteria chosen for this experiment were selected from the many orally relevant species. One such suitable species of bacteria is *Actinomyces naeslundii*, a well-known early colonizer of the mouth. A bacterial suspension of *A. naeslundii* was first prepared by inoculating trypticase soy broth (TSB). After incubation overnight at 37.5 °C, the suspension was diluted with additional TSB until the optical density (O.D.) was between 0.015 and 0.2. (The optical density in this case corresponds to the overall quantity of bacteria in the suspension.) The toothbrushes were carefully cleaned with mild detergent and then disinfected for 60 seconds in 70% ethanol. After air drying, the bristles of the brushes were dipped into the bacterial suspension for 60 seconds, rinsed in phosphate buffered saline (PBS) for 0-60 seconds, then brushed over the surface of separate agar plates. These agar plates were incubated for 2 days at 37.5 °C at which time a visual inspection was made of the colony forming units (CFU's).

At higher concentrations of bacteria, > 0.05 O.D., it was not possible to count the CFU's reliably. However, in a visual inspection of these experiments there was always clearly a less dense lawn of bacterial colonies on the plate brushed with the silicone containing bristles. As the bacterial load was reduced to a OD of 0.017-0.020, two out of

three experiments performed showed a clear 18-25% reduction in bacteria in toothbrushes with Nylon 6.6 + 3% silicone-modified polyamide, relative to Nylon 6,12.

trial	Toothbrush Material		% reduction
	Nylon 6,12 (CFU)	Nylon 6.6 with 3% additive (CFU)	
1	290	387	25
2	980	1192	18

All the references discussed in this application are incorporated by reference in
5 their entirety for all useful purposes.

While there is shown and described certain specific structures embodying the invention, it will be manifest to those skilled in the art that various modifications and rearrangements of the parts may be made without departing from the spirit and scope of the underlying inventive concept and that the same is not limited to the particular forms
10 herein shown and described.

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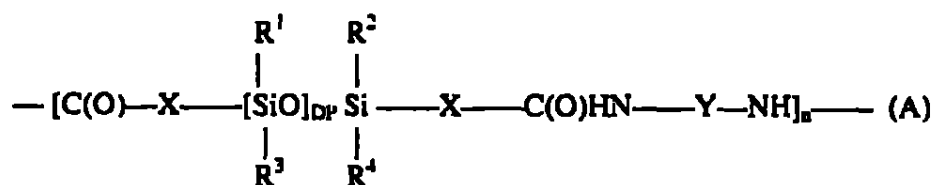
We claim:

1. A material useful in oral care products which comprises a silicon-modified polyamide blended with a different polyamide material.
2. The material as claimed in claim 1, wherein said different polyamide material
5 is a synthetic polyamide.
3. The material as claimed in claim 1, wherein said different polyamide material is nylon 6, nylon 6,6, nylon 6,10 or nylon 6,12.
4. The material as claimed in claim 1, wherein said different polyamide material is nylon 6,6.
- 10 5. The material as claimed in claim 1, wherein said siloxane-based polyamide (1) comprise both siloxane groups and amide groups to thicken compositions containing silicone fluids (volatile and/or non-volatile silicone fluids): (2) are non-flowable solids at room temperature: and (3) dissolve in a fluid which contains silicone at a temperature of 25-160 degrees C. to form a translucent or
15 clear solution at a temperature in this range.
6. The material as claimed in claim 1, wherein the silicon-modified polyamide comprises
 - a) 0.5-80 percent by weight based on the total weight of the composition of at least one siloxane-based polyamide:
 - 20 (b) 5-95 percent by weight silicone fluid: and
 - (c) if (a)+(b) do not equal 100 percent, then a portion of solvent sufficient to make 100 percent, wherein:

2/71

the siloxane-based polyamide is formed from units of Formula A

5



10

where: (1) n is a number selected from the group consisting of 1-500,

where n is the number of units in the polyamide;

15

(2) DP is an average value for degree of polymerization of a siloxane portion of the polyamide and is selected from the group consisting of 1-700;

(3) X is a linear or branched chain alkylene having 1-30 carbons:

20

(4) each of R¹ -R⁴ is independently selected from the group consisting of methyl, ethyl, propyl, isopropyl, a siloxane chain, and phenyl, wherein the phenyl may optionally be substituted by 1-3 members from the group consisting of methyl and ethyl; and

25

(5) Y is selected from the group consisting of linear or branched chain alkenes having 1-40 carbons, wherein the alkylene group itself may optionally be substituted by at least one member selected from the group

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consisting of

(i) hydroxy:

5

(ii) C₃-C₈ cycloalkane:

(iii) 1-3 members selected independently from the group consisting of C₁-C₃ alkyls: phenyl optionally substituted by 1-3 members independently selected from the group consisting of C₁-C₃ alkyls:

10

(iv) C₁-C₃ alkyl hydroxy: and

(v) C₁-C₆ alkyl amine:

15

or Y may be Z where $Z = R^{20} T(R^{22})R^{21}$ where each of R²⁰, R²¹ and R²² is independently selected from the group consisting of linear and branched C₁-C₁₀ alkyl or alkylene groups: and T is selected from the group consisting of CR, where R is selected from the group consisting of hydrogen, the group consisting of the group defined for R¹-R⁴: and a

20

trivalent atom selected from the group consisting of N, P and Al: and wherein each value for X, Y, DP and R¹-R⁴ may be the same or different for each unit in the polyamide.

7. The material as claimed in claim 6, wherein said different polyamide material is nylon 6, nylon 6,6: nylon 6,10 or nylon 6,12.

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8. The material as claimed in claim 6, wherein said different polyamide material is nylon 6.6.
9. A filament which comprises said material as claimed in claim 1.
10. A filament which comprises said material as claimed in claim 8.
- 5 11. An oral care product which comprises at least one of said filament as claimed in claim 9.
12. The oral care product as claimed in claim 11, wherein the product is a toothbrush, dental floss, dental tape or paint brush.
- 10 13. Dental floss which comprises at least one of said filaments as claimed in claim 9.
14. A toothbrush bristle which comprises at least one of said filaments as claimed in claim 10.
15. A toothbrush which comprises at least one toothbrush bristle as claimed in claim 13.
- 15 16. The toothbrush as claimed in claim 15, wherein said toothbrush is an electric toothbrush.
17. The toothbrush as claimed in claim 15, wherein said toothbrush is a non-electric toothbrush.
18. A brush used for whitening the teeth which comprises at least one of said filaments as claimed in claim 9.
- 20 19. Dental tape which comprises at least one of said filaments as claimed in claim 9.

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ABSTRACT

The invention is directed to a new material useful in oral care products such as dental floss or as a toothbrush bristle. The material is a silicon-modified polyamide blended with a different polyamide material. The preferred different polyamide material is the conventional material used to make bristles of toothbrushes. The different polyamide material is preferably a nylon material.

10

7/15/03

PCT

GENERAL POWER OF ATTORNEY

(for several international applications filed under the Patent Cooperation Treaty)

(PCT Rule 90.5)

The undersigned person(s):

(Family name followed by given name; for a full legal entity, full official designation. The address must include postal code and name of country.)

COLGATE-PALMOLIVE COMPANY

300 Park Avenue

New York, New York 10022

United States of America

hereby appoint(s) the following person as:

☒ agent

☐ common representative

Name and address

(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

Martin B. Barancik, Henry S. Goldfine, Bernard Lieberman, Michael J. McGreal, Rosemary M. Milano, Richard E. Nanfeldt, Ellen Park and Clifford Wilkins of

COLGATE-PALMOLIVE COMPANY

909 River Road

P.O. Box 1343

Piscataway, New Jersey 08855-1343

United States of America

to represent the undersigned before

☒ all the competent International Authorities

☐ the International Searching Authority only

☐ the International Preliminary Examining Authority only

in connection with any and all international applications filed by the undersigned with the following Office

RO/US

as receiving Office

and to make or receive payments on behalf of the undersigned.

Signature(s) (where there are several persons, each of them must sign; next to each signature, indicate the name of the person signing and the capacity in which the person signs. If such capacity is not obvious from reading this power):



Andrew D. Hendry
Senior Vice President, General Counsel and
Secretary

Date: October 16, 2003

88 76

PCT (ANNEX - FEE CALCULATION SHEET)

6844-00

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(This sheet is not part of and does not count as a sheet of the international application)

0	For receiving Office use only		
0-1	International Application No.		
0-2	Date stamp of the receiving Office		
0-4	Form - PCT/RO/101 (Annex) PCT Fee Calculation Sheet Prepared using	PCT-EASY Version 2.92 (updated 01.07.2003)	
0-8	Applicant's or agent's file reference	6844-00	
2	Applicant	COLGATE-PALMOLIVE COMPANY, et al.	
12	Calculation of prescribed fees	fee amount/multiplier	Total amounts (USD)
12-1	Transmittal fee T	⇒	240
12-2-1	Search fee S	⇒	700
12-2-2	International search to be carried out by	US	
12-3	International fee		
	Basic fee (first 30 sheets) b1	476	
12-4	Remaining sheets	0	
12-5	Additional amount (X)	12	
12-6	Total additional amount b2	0	
12-7	b1 + b2 = B	476	
12-8	Designation fees		
	Number of designations contained in international application	98	
12-9	Number of designation fees payable (maximum 5)	5	
12-10	Amount of designation fee (X)	104	
12-11	Total designation fees D	520	
12-12	PCT-EASY fee reduction R	-148	
12-13	Total international fee (B+D-R) I	⇒	848
12-14	Fee for priority document		
	Number of priority documents requested	1	
12-15	Fee per document (X)	20	
12-16	Total priority document fee P	⇒	20
12-17	TOTAL FEES PAYABLE (T+S+D+P)	⇒	1,808
12-19	Mode of payment	authorization to charge deposit account	
12-20	Deposit account instructions The receiving Office:	United States Patent and Trademark Office (USPTO) (RO/US)	
12-20-1	Authorization to charge the total fees indicated above.	✓	

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PCT (ANNEX - FEE CALCULATION SHEET)

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12-20-2	Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.	✓
12-20-3	Authorization to charge the fee for priority document.	✓
12-21	Deposit account No.	03-2457
12-22	Date	24 October 2003 (24.10.2003)
12-23	Name and signature	DUNNE, Elizabeth, M. <i>Elizabeth M. Dunne</i>

VALIDATION LOG AND REMARKS

13-2-7	Validation messages Contents	Yellow! The power of attorney or a copy of the general power of attorney will need to be furnished unless all applicants sign the request form.
		Green? The international application contains no drawings. Please verify.
13-2-8	Validation messages Payment	Green? Please ensure that you have a valid deposit account with the receiving Office selected.

82 78

Apostille

(Convention de La Haye du 5 Octobre 1961)

1. Country: **United States of America**
This public document.
2. has been signed by **Norman Goodman**
3. acting in the capacity of **County Clerk**
4. bears the seal/stamp of the county of **New York**

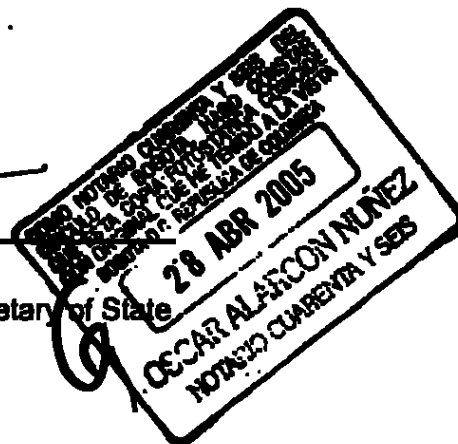
Certified

5. At New York, New York
6. the 30th day of October 2001
7. by Special Deputy Secretary of State, State of New York
8. No. NYC-9786540B
9. Seal/Stamp
10. Signature



Aqil M. Qureshi

Aqil M. Qureshi
Special Deputy Secretary of State



279

FROM : BRIGARD Y CASTRO

PHONE NO. : 3882700

OCT. 29 2001 01:03PM P2

Brigard & Castro

SANTA FE DE BOGOTA - COLOMBIA

PODER

POWER OF ATTORNEY

Yo (nosotros)

domiciliado(s) en

Nombre(amos) a: RAMIRO CASTRO DUQUE y/o JUAN PABLO CADENA SARMIENTO y/o BEATRIZ JARAMILLO S.

de Santafé de Bogotá, Colombia, apoderados verdaderos y legales con poder especial, amplio y suficiente, para recabar de las oficinas y autoridades colombianas administrativas, judiciales y de policía, en cualquier instancia o recurso, la obtención de patentes de invención, registros de marcas, diseños industriales, modelos de utilidad, depósitos de nombres comerciales y enseñas, registros de derechos de autor y contratos sobre los mismos, obtención de certificados de obtención de variedades vegetales, así como sus prórrogas, renovaciones, anotaciones de traspaso, cambios de nombre y/o domicilio; elaborar, tramitar y registrar contratos de licencia y licencias de cualesquiera clases; intervenir como demandantes o como demandados en cualquier instancia y recurso ante cualquier juez, corporación, funcionario público o autoridad en acciones judiciales, administrativas y de policía tales como: oposiciones al registro de marcas; acciones de caducidad, cancelación y nulidad; acciones reivindicatorias, acciones derivadas de la obtención o explotación de licencias; acciones de competencia desleal; demandas penales; acciones de indemnización de perjuicios, reclamos y observaciones a solicitudes de patentes, diseños industriales, modelos de utilidad, en el ejercicio de medidas cautelares y en otras acciones o medidas similares.

A este efecto, los(as) facultamos para elevar solicitudes, formular descripciones, enmiendas, protestas, declaraciones, oposiciones, cancelaciones, nulidades, apelaciones y reclamos; pagar impuestos, cuotas y gravámenes prescritos por la ley; renunciar o desistirse a derechos concedidos o en curso de concesión; recibir toda clase de documentos y valores, dando el descargo respectivo, y, en general, para dar ante dichas autoridades todos los pasos necesarios al efecto indicado y tomar todas las medidas que creyeren conducentes al resguardo de mis (nuestros) intereses, con todas las demás facultades legales necesarias.

Este poder comprende la facultad de ratificar o confirmar en mi (nuestro) nombre lo actuado así como la facultad de desistirse, transigir, comprometer, y la de sustituirlo en todo o en parte y revocar sustituciones. Asimismo nombro(amos) a: RAMIRO CASTRO DUQUE y/o JUAN PABLO CADENA SARMIENTO y/o BEATRIZ JARAMILLO S. domiciliado(s) en la Carrera 7 No. 16-56 Piso 9, mis (nuestros) apoderados en Colombia, con facultades para recibir notificaciones y designar apoderados judiciales o extrajudiciales.

Otorgado y firmado en

hoy de

Firma

Nombre

VICE PRESIDENT &
ASSOCIATE GENERAL COUNSEL
TRADEMARK

I (We)

COLGATE-PALMOLIVE COMPANY, a Delaware corporation, of 300 Park Avenue, New York, New York 10022, U. S. A.

Hereby appoint RAMIRO CASTRO DUQUE and/or JUAN PABLO CADENA SARMIENTO and/or BEATRIZ JARAMILLO S.

of Santafé de Bogotá, Colombia, my (our) true and lawful attorneys with special, ample and sufficient power to obtain from the Colombian administrative, judicial and police offices and authorities, in any instance, privileges of patents of invention, registration of trademarks, industrial designs and utility models; registration of commercial names and emblems, registration of copyright and contracts related thereto, certificates of obtainment of vegetable varieties, as well as extensions, renewals and recordal of assignments and changes of name and domicile related to the above; to prepare, prosecute and register licenses of any kind; to act as plaintiff or defendant in any instance or recourse, and before any judge, corporation, public official or authority in judicial, administrative and police actions, such as: oppositions to the registration of trademarks; caducity, cancellation and nullity actions; claim actions derived from the obtaining or exploitation of licenses, action of unfair competition; penal demands, actions of indemnities for damages; claims or observations on patent applications, models, industrial designs and utility models; in the exercise of preventive measures; and in other actions or similar proceedings.

To that effect they are hereby empowered to file applications, formulate descriptions, amendments, protests, declarations, oppositions, cancellations, nullities, appeals and claims; to pay taxes, quotas, assessments prescribed by law, renounce or desist from rights granted or in the process of granting; to receive all kind of documents and values, giving the respective release of receipt, and to take all the steps before said authorities the effect, and any measures pertinent to the safeguarding of my (our) interests, with all the other necessary measures.

This power includes the faculty to ratify or confirm, settle and compromise in my (our) name, and to substitute this power in whole or in part and to revoke substitutions. At the same time I (We) hereby appoint RAMIRO CASTRO DUQUE and/or JUAN PABLO CADENA SARMIENTO and/or BEATRIZ JARAMILLO S.

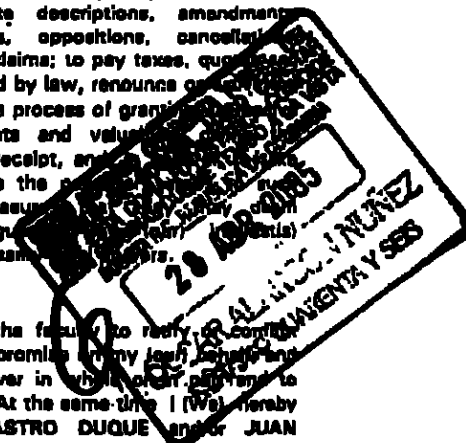
domiciled in Carrera 7 No. 16-56, Piso 9, my (our) attorney(s) in fact, with powers to receive notifications and to designate judicial and extrajudicial attorneys.

Granted and signed in New York, N.Y.

This OCT 29 2001 day of 2001

Signature *Brigard & Castro*

Nombre



80

FROM BRIGARD Y CASTRO

PHONE NO. : 3982780

OCT. 29 2001 01:18PM P4

CERTIFICADO NOTARIAL (SOCIEDAD)

NOTARIAL CERTIFICATE (CORPORATION)

Hoy de de
personalmente compareció ante mí
a quien conozco, y de quien me consta que firmó el
anterior documento, debidamente juramentado declaró
y dijo que él es

de

Sociedad legalmente constituida para un periodo de
duración que aún no ha terminado; que el declarante
está autorizado por dicha compañía para conferir este
poder; que el sello estampado por él al pie de tal poder,
en nombre y representación de la expresada compañía,
es el sello oficial de ella; y que el objeto para el cual se
confiere este instrumento está comprendido dentro del
de la sociedad.

El suscrito Notario hace constar que tuvo a la vista las
pruebas de la existencia de la sociedad.

Estado es
con fecha

y que quien confiere el presente poder es su
representante.

Notario Público (sello)

CERTIFICADO NOTARIAL
PERSONA NATURAL

Hoy de de , compareció(eron)
ante mí ,

a quien (es) conozco y me consta que es(son) la(s)
persona(s) firmante(s) del documento que precede y
quien(es) declara(n) que otorgan el mismo para los
fines y propósitos que en él se expresan.

Notario Público (sello)

LEGALIZACION POR APOSTILLA ES REQUERIDA.

On this OCT 29 2001 day of of
personally appeared before me

SCOTT E THOMPSON
to me known, and known to me to be the person who
signed the foregoing instrument who being by me duly
sworn did depose and say that he (she) is the

VICE PRESIDENT &
of ASSOCIATE GENERAL COUNSEL
TRADEMARK
COLGATE-PALMOLIVE COMPANY

Which is legally constituted for a term not yet expired,
that deponent is authorized by said Company to confer
this Power of Attorney: that the seal affixed hereunto
by the deponent in the name and on behalf of said
Corporation is the corporate seal thereof; and that the
purpose for which this instrument is granted is
included within the corporate purpose of company.

The undersigned Notary Public attests that he has seen
the documents that prove the existence of the
company.

State of Delaware
under date of May 13, 1997

and that he (she) who grants the present power of
attorney is its Representative.

ROSIE S. DIZON
Notary Public

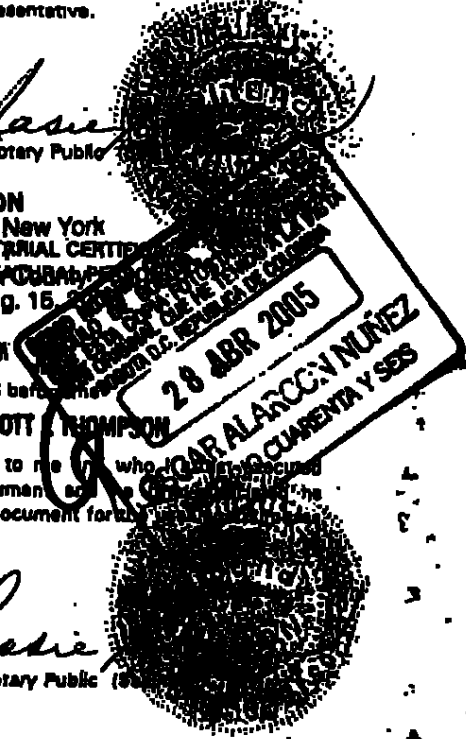
ROSIE S. DIZON
Notary Public, State of New York
No. 31-494117
Qualified in New York County
Commission Expires Aug. 15, 2002

On this OCT 29 2001
personally appeared before me

SCOTT E THOMPSON
who is(are) known to me who (they) executed
the foregoing document and who (they) grant(s) the document for the purposes
therein expressed.

ROSIE S. DIZON
Notary Public

LEGALIZATION BY ROSIE S. DIZON
Notary Public, State of New York
No. 31-494117
Qualified in New York County
Commission Expires Aug. 15, 2002



NEW YORK
COUNTY

252373

Form 1

81

Notary Public
County of New York

I, NORMAN GOODMAN, County Clerk and Clerk of the Supreme Court of the State of New York, in and for the County of New York, a Court of Record, having by law a seal,
DO HEREBY CERTIFY pursuant to the Executive Law of the State of New York, that

Rosie S. Dizon

whose name is subscribed to the annexed affidavit, deposition, certificate of acknowledgment or proof, was at the time of taking the same a NOTARY PUBLIC in and for the State of New York duly commissioned, sworn and qualified to act as such; that pursuant to law, a commission or a certificate of his official character, with his autograph signature has been filed in my office; that at the time of taking such proof, acknowledgment or oath, he was duly authorized to take the same; that I am well acquainted with the handwriting of such NOTARY PUBLIC or have compared the signature on the annexed instrument with his autograph signature deposited in my office, and I believe that such signature is genuine.

IN WITNESS WHEREOF, I have hereunto set my hand affixed my official seal this

OCT 30 2001

FEE PAID \$3.00

Norman Goodman
County Clerk and Clerk of the Supreme Court, New York County



✓ 82

APOSTILLE

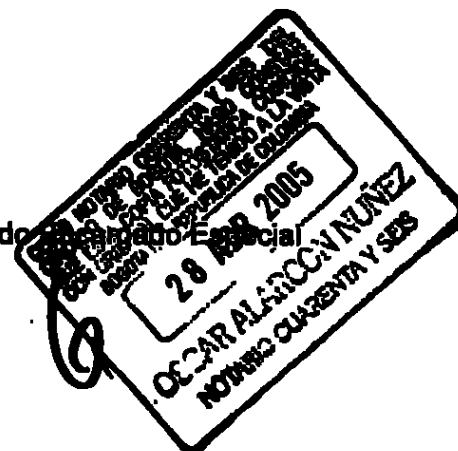
(Convención de La Haya del 5 de Octubre de 1961)

1. País: ESTADOS UNIDOS DE AMERICA
Este documento público
2. ha sido firmado por Norman Goodman
3. actuando en capacidad de Oficial del Condado
4. lleva el sello/timbre del condado de New York

CERTIFICADO

5. en New York, New York
6. el 30 de Octubre de 2001
7. por Secretario de Estado Encargado Especial, Estado de New York
8. No. NYC-9786540B
9. Sello/Timbre
10. Firma

(Firma)
Aqull M. Qureshi
Secretario de Estado Encargado Especial



~~8~~ 83

Certificado Notarial

252373

Yo, NORMAN GOODMAN, Oficial del Condado y Oficial de la Corte Suprema del Estado de New York, en y para el Condado de New York, un Tribunal de Registros, que tiene un sello por ley.

CERTIFICO POR MEDIO DE LA PRESENTE de acuerdo con la Ley
Ejecutiva del Estado de New York, que
Rosale S. Dizon

cuyo nombre está suscrito al acta notarial, deposición, certificado de reconocimiento o prueba, era al momento de tomar el mismo NOTARIO PÚBLICO en y para el Estado de New York debidamente comisionado, juramentado y calificado para actuar como tal; que de acuerdo con la ley, una comisión o un certificado de este carácter oficial, con su firma autógrafa ha sido presentada en mi oficina; que al momento de tomar tal prueba, reconocimiento o juramento, estaba debidamente autorizado para tomar el mismo; que estoy bien familiarizado con la escritura de tal NOTARIO PÚBLICO o he comparado la firma en el instrumento anexo con la firma autógrafa depositada en mi oficina, y creo que la firma es genuina.

COMO TESTIGO DE LO MISMO, he fijado al presente mi firma y sello
oficial este

30 de Octubre de 2001
TARIFA PAGADA \$3.00

(Firma)
Oficial del Condado y Oficial de la Corte Suprema, Condado de New York





GAVIRI A 8884

ORGANIZACION ELECTORAL
REGISTRADURIA NACIONAL DEL ESTADO CIVIL

REGISTRO CIVIL DE DEFUNCION

Indicativo
Serial

5562241

Datos de la oficina de registro													
Clase de oficina: Registraduría		Notaría ☒		Consulado		Corregimiento		Insap. de Policía		Código 9795			
País: Colombia - Departamento: Cundinamarca - Municipio: Bogotá D.C. - Corregimiento o Inspección de Policía: NOTARIA 32.													
Datos del inscrito													
Apellidos y nombres completos CASTRO DUQUE RAMIRO													
Documento de identificación (Clase y número) C.C. No. 170322 DE BOGOTA								Sexo (en Letras) MASCULINO					
Datos de la defunción													
Lugar de la Defunción País - Departamento - Municipio - Corregimiento o Inspección de Policía COLOMBIA CUNDINAMARCA BOGOTA D.C.													
Fecha de la defunción				Hora		Número de certificado de defunción							
Año	2	0	0	4	Mea	1	0	Día	3	0	04:10 PM	A-	2094375.
Lugar que profiere la sentencia						Presunción de muerte				Fecha de la sentencia			
-----						Año				Mea		Día	
Documento presentado						Nombre y cargo del funcionario							
Autorización judicial ☐						Certificado Médico ☒				ANDRES DIAZ CAMPOS.- R. M. No. 79982662			
Datos del denunciante													
Apellidos y nombres completos EDGAR DAVID REGINO H.													
Documento de identificación (Clase y número) C.C. No. 15.030.154 DE LORICA/ CORDOBA								Firma 					
Primer testigo													
Apellidos y nombres completos -----													
Documento de identificación (Clase y número) -----								Firma -----					
Segundo testigo													
Apellidos y nombres completos -----													
Documento de identificación (Clase y número) -----								Firma -----					
Fecha de inscripción						Notario y firma del Registrador que autoriza							
Año	2	0	0	4	Mea	1	1	Día	0	2	BLANCA NOTARIO RESTREPO		
PADRES: ALFONSO CASTRO										ESPACIO PARA NOTAS			
MERCEDES DUQUE.													

ORIGINAL PARA LA OFICINA DE REGISTRO

NOTARIA 32

DEL CÍRCULO DE SANTA FE DE BOGOTÁ, D.C.

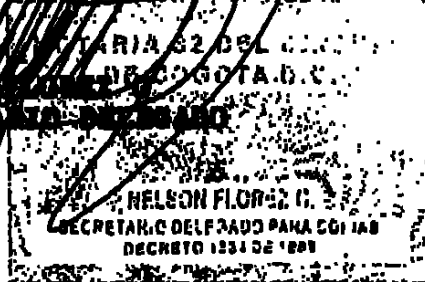
Germán Eleázar Moreno L.
Notario

COMO SECRETARIO DELEGADO DE LA NOTARIA TREINTA Y DOS (32) DEL
CÍRCULO DE BOGOTÁ

CERTIFICO, QUE:

La presente acta es fiel copia del original tomada del registro
civil de defunciones serial indicativo número: 56224
que expido en la ciudad de Bogotá D.C. hoy: 05 NOV. 2004

SECRETARIO DELEGADO



85

REQUISITOS NECESARIOS PARA PRESENTACION Y AGILIZACION DEL TRAMITE

	USUARIO	RADICADOR
PATENTE DE INVENCION	()	()
MODELO DE UTILIDAD	()	()
- Indicación de que se solicita la concesión de una patente.	()	()
- Datos de identificación del solicitante o de la persona que se presenta la solicitud.	()	()
- Descripción de la invención.	()	()
- Dibujos de ser estos pertinentes.	()	()
- Comprobante de Pago de las tasas establecidas.	()	()

COMPLETA () INCOMPLETA ()

DISEÑO INDUSTRIAL ()

- Indicación de que se solicita el registro de Diseño Industrial	()	()
- Datos de identificación del solicitante o de la persona que presenta la solicitud.	()	()
- Representación gráfica o folográfica del Diseño Industrial o muestra del Material que incorpora el diseño.	()	()
- Comprobante de pago de las tasas establecidas	()	()

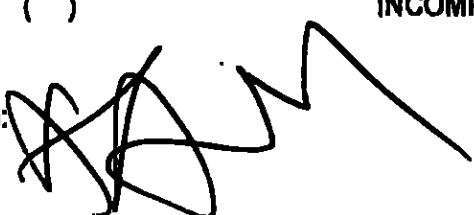
COMPLETA () INCOMPLETA ()

ESQUEMA DE TRAZADO ()

- Indicación de que solicita el registro de un Esquema de trazado.	()	()
- Datos de identificación del solicitante o de la persona que presenta La solicitud.	()	()
- Representación gráfica del esquema de trazado	()	()
- Comprobante de pago de las tasas establecidas.	()	()

COMPLETA () INCOMPLETA ()

Firma Responsable:



Fecha:

SUPERINTENDENCIA Y COMERCIO
Radicación : 05049657 00000000 Folio: PA
Fecha (AÑO): 2005-05-23 16:31:50
Trámite : 011 DPT-PATENT 379 CACE MARC 411 PRESENTAR
Dependencia: 0000 ATUCCION DE SERVICIO REGISTRADO

46 40

REPUBLICA DE COLOMBIA
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

Bogotá,
2020

Doctor(a)
CADENA SARMIENTO JUAN PABLO

REFERENCIA	Radicación No.	5 49653
	Solicitud internacional	US2003/033914
	Fecha inicio fase nacional	24/05/2005
	Trámite	11
	Evento	379
	Actuación	430
	Oficio No.	0657?

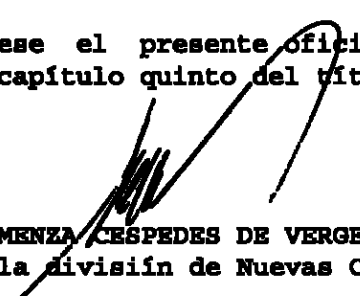
Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, artículo 27 del Tratado de Cooperación en Materia de Patentes (PCT), regla 51 bis del Reglamento y Circular Única de la Superintendencia de Industria y Comercio, se le comunica que:

1. La solicitud no contiene las copias de los documentos en que constan las cesiones de los derechos a la patente de los inventores a los solicitantes o a sus causantes. (Art. 26-k) Decisión 486.

2. La solicitud no contiene el poder debidamente otorgado por la sociedad Dow Corning Corporation, con el lleno de los requisitos exigidos por los artículos 63 y subsiguientes del Código de Procedimiento Civil. Adicionalmente, deberá presentar el documento que acredita la existencia y representación legal de la sociedad solicitante.

En cumplimiento de lo dispuesto por el artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos meses siguientes a la fecha de notificación del presente oficio, complete los requisitos anteriormente enunciados. En caso de no dar cumplimiento al presente requerimiento, la solicitud se considerará abandonada y perderá su prelación.

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 No.10 de 2001.


ALIX CARMONA CESPEDES DE VERGEL
Jefe de la división de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista de fecha 05 AGO. 2005
adpal