176

175

1

Castillo Grau & Asociados
ABOGADOS

Señores
DIVISIÓN DE NUEVAS CREACIONES
SUPERINTENDENCIA DE INDUSTRIA Y COI
Bogotá, D.C.

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
No. 04-060377- -00011-0000
Fecha: 2010-05-05 13:46:37 Dep: 2020 DIR NUEVASCR
Tra: 11 PATENTEIYII Eve: 379 FASENACIONALII
Act: 444 RESPUESTAREQUE Folios: 12

Re.: Código 011-378-444
Expediente No. 04-60.377
Fase nacional de Solicitud
de Patente PCT
H.B. FULLER LICENSING
& FINANCING, INC.

En relación con el expediente de la referencia y dando cumplimiento a la última providencia recaída sobre este asunto por medio del presente escrito me permito manifestarles lo siguiente:

1. Adjunto una nueva versión del capítulo reivindicatorio la cual se ha redactado de una manera diferente para e mejor y más claro entendimiento.
2. En esta nueva versión, en la Reivindicación 1 se le ha agregado la partícula "un" antes de "polímero termoplástico" para un mejor entendimiento por parte del Examinador.

   Adicionalmente esta reivindicación se ha redactado de una forma más clara para hacer énfasis en que el valor "x" hace parte de la fórmula (A-B)x como un entero de al menos uno, pero que los elementos siguientes no hacen parte de ese valor "x" sino parte de la composición termoplástica reivindicada.
3. Con relación a la necesidad de presentar un test universal para la capacidad de absorción mi representada informa que en la única jurisdicción donde se ha hecho referencia a este tema es en la solicitud europea. En efecto, el Examinador en Europa fue el único que tuvo una preocupación por la frase "solución salina de 0.9%", sin embargo este examinador no sostuvo que el método del test debía ser un método universal o que el método del test presentado fuera objetable.

   El Examinador europeo consideró que la frase "solución salina de 0,9%" carecía de claridad por cuanto una persona versada en esta materia no podría determinar si la cantidad de salinidad en la solución salina de 0,9% era basada en moles, volumen o peso.

4. En la primera respuesta al Examinador, los apoderados de la sociedad solicitante sostuvieron que no tendría sentido técnico determinar la cantidad de sólido en una solución acuosa por moles e incluso por volumen. Se afirmó que este test (el uso de solución salina de 0,9% (w/w)) es un test estándar para la evaluación de las propiedades superabsorbentes bajo condiciones "realísticas". Posteriormente citó un extracto de una página de internet cuyo título en alemán es "Vernetztes Studium Chemie" que establece que es común probar la abosrbencia utilizando una solución salina de 0,9%. En otras palabras, es el uso de una solución salina de 0,9% que es estándar al momento de comprobar la abosrbencia.
5. Posteriormente en una segunda acción, el Examinador europeo afirmó que ahora el término "solución salina de 0,9%" ya no carecía de claridad pero que la modificación de "solución salina de 0,9%" a "solución salina de 0,9% w/w"no se encontraba soportada en la descripción.
6. En la siguiente respuesta de la solicitante, se puso de presente que en la descripción se establece, antes de la presentación de los ejemplos, que "salvo indicación en contrario, todas las partes, relaciones, porcentajes y cantidades que se indican en los Ejemplos son por peso". De igual manera se anotó que a lo largo de todo el texto de la descripción, incluida la sección de los Ejemplos, la sociedad solicitante se refiere a solución salina acuosa de 0,9%. Luego de estas explicaciones el Examinador Europeo retiró sus objeciones y recientemente sostuvo que las reivindicaciones eran patentables.
7. Adjuntamos pare referencia del Examinador copias de los documentos arriba mencionados.
8. Si estas explicaciones no satisfacen a la División adjuntamos una segunda versión del capítulo reivindicatorio de la cual se han retirado todas las reivindicaciones que hacen referencia a la solución salina de 0,9% para que sea concedida, por cuanto mi representada no conoce ninguna prueba universal sobre el particular diferente a la prueba indicada en la descripción.

En consecuencia, les solicito conceder el privilegio de patente de invención aquí tramitado.

De Ustedes Atentamente,

LUIS FELIPE CASTILLO GIBSONE
T.P. No. 68.995 del C.S.J.

177 178

REIVINDICACIONES:

1. Una composición termoplástica que comprende

de 1% por peso a 25% por peso de un polímero termoplástico que comprende

un copolímero de bloque con la fórmula (A-B)x o A-B-A, donde el bloque A comprende polivinilalareno, el bloque B comprende dieno conjugado, dieno hidrogenado, o una combinación de lo mismo, y x es un entero de al menos uno,

poliolefina amorfa,

poliolefina cristalina,

interpolímeros de etileno,

polibutileno,

poliacturo,

poli(hidroxi-butirato/hidroxivalerato),

alcohol polivinílico,

copoliésteres,

poliésteres,

poli(oxido de etileno) poliéter amida,

copolímeros de bloque de poliéster éter,

poliamidas

o una combinación de lo anterior;

de 45% por peso a 75% por peso de partículas esféricas de polímero superabsorbentes que comprenden poliacrilato y que tienen un diámetro de partícula promedio de entre 20 µm y 30 µm; y

un plastificante,

dicha composición exhibe una viscosidad no mayor de 65 Pas (65.000 centipoise) a 149°C (300°F)

2. La composición termoplástica de la reivindicación 1, que además comprende un surfactante.

3. La composición termoplástica de la reivindicación 1, que además comprende entre 1% por peso y 5% por peso de surfactante.

4. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3,que comprende entre 60% por peso y 75% por peso de dicho polímero superabsorbente.

5. La composición termoplástica de cualquiera de las reivindicaciones 1-3, en donde el copolímero de bloque es seleccionado del grupo consistente de estireno-isopreno-estireno, estireno-butadieno hidrogenado-estireno, estireno-isopreno hidrogenado-estireno, estireno-butadieno-estireno y combinaciones de lo anterior

6. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 2 minutos.

7. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 1 minuto.

8. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en solución salina de 0,9% no mayor de 4 horas.

9. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en solución salina de 0,9% no mayor de 10 minutos.

10. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en solución salina de 0,9% no mayor de 5 minutos.

11. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad absorbente de al menos 60 g agua/g de composición.

12. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad absorbente de al menos 70 g agua/g de composición.

13. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad absorbente de al menos 100 g agua/g de composición.

14. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad de al menos 25 g de solución salina de 0,9%/g de composición.

15. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad de al menos 35 g de solución salina de 0,9%/g de composición.

16. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3 que además comprende un agente de adhesión o pegajosidad.

17. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 2 minutos y una fuerza tensora húmeda de al menos 2,3g/cm^2.

18. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 1,5 minutos, una viscosidad no mayor de 30,000 cps a 149 °C (300°F) y una fuerza tensora húmeda de al menos 6,2g/cm^2.

19. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 2 minutos, y una capacidad de absorción de al menos 70 g agua/g de composición y al menos 10 g de solución salina de 0,9%/g de composición.

REIVINDICACIONES:

1. Una composición termoplástica que comprende

de 1% por peso a 25% por peso de un polímero termoplástico que comprende

un copolímero de bloque con la fórmula (A-B)x o A-B-A, donde el bloque A comprende polivinilalareno, el bloque B comprende dieno conjugado, dieno hidrogenado, o una combinación de lo mismo, y x es un entero de al menos uno,

poliolefina amorfa,

poliolefina cristalina,

interpolímeros de etileno,

polibutileno,

poliacturo,

poli(hidroxi-butirato/hidroxivalerato),

alcohol polivinílico,

copoliésteres,

poliésteres,

poli(oxido de etileno) poliéter amida,

copolímeros de bloque de poliéster éter,

poliamidas

o una combinación de lo anterior;

de 45% por peso a 75% por peso de partículas esféricas de polímero superabsorbentes que comprenden poliacrilato y que tienen un diámetro de partícula promedio de entre 20 µm y 30 µm; y

un plastificante,

dicha composición exhibe una viscosidad no mayor de 65 Pas (65.000 centipoise) a 149°C (300°F)

2. La composición termoplástica de la reivindicación 1, que además comprende un surfactante.

3. La composición termoplástica de la reivindicación 1, que además comprende entre 1% por peso y 5% por peso de surfactante.

4. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3,que comprende entre 60% por peso y 75% por peso de dicho polímero superabsorbente.

5. La composición termoplástica de cualquiera de las reivindicaciones 1-3, en donde el copolímero de bloque es seleccionado del grupo consistente de estireno-isopreno-estireno, estireno-butadieno hidrogenado-estireno, estireno-isopreno hidrogenado-estireno, estireno-butadieno-estireno y combinaciones de lo anterior

6. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 2 minutos.

7. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 1 minuto.

8. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad absorbente de al menos 60 g agua/g de composición.

9. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad absorbente de al menos 70 g agua/g de composición.

10. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad absorbente de al menos 100 g agua/g de composición.

11. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3 que además comprende un agente de adhesión o pegajosidad.

12. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 2 minutos y una fuerza tensora húmeda de al menos 2,3g/cm^2.

13. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 1,5 minutos, una viscosidad no mayor de 30,000 cps a 149 °C (300°F) y una fuerza tensora húmeda de al menos 6,2g/cm^2.

14. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 2 minutos, y una capacidad de absorción de al menos 70 g agua/g de composición y al menos 10 g de solución salina de 0,9%/g de composición.

183 182

Bescheid/Protokoll (Anlage) | Communication/Minutes (Annex) | Notification/Procès-verbal (Annexe)

Datum / Date / Date: 26.07.2005 | Blatt / Sheet / Feuille: 2 | Anmelde-Nr.: / Application No.: / Demande n°: 03 729 696.9

European Examiner's Statement I

claims or pay additional fees relating to the said lacks of unity.
The applicant decided to pay the additional fees for all claims and consequently this substantive examination can be based on all application claims 1-34 as filed.

Article 84 EPC and Rule 35(12) EPC

3. The present application does not meet the requirements of Article 84 EPC for clarity for the following reasons :
(a) The use in present claim 1 and throughout the present application, e.g. description page 3, line 19 ; page 5, line 10-17 ; page 11, line 11-22 ; examples and tables ; claims 18,19, 34 etc. of non S.I. units is not in accordance with Rule 35(12) EPC, and is leading to a lack of clarity of the claimed subject-matter.
(b) The use of the term "about" as used throughout the application, e.g. application claim 1 "..about 1% by weight" etc. should be deleted as it has no clear meaning leading to subjectivity.
(c) The use of the term "0.9 % aqueous saline solution" as used throughout the application, e.g. application claims 9-11, 16 etc., is considered to lack clarity as to whether it is 0,9% by weight, or by moles, or by volume etc.
(d) The present application claims appear to contain lacks of clarity regarding the number ordering of the actual claims, e.g application claim 22 (and dependent claims thereon), presently can comprise the thermoplastic composition of claims 33-34 which obviously at the point of the said claim 22, have not previously been defined and claimed.

Article 54 EPC

4. The present application is deemed not to meet the requirements of Article 52(1) EPC and 54 EPC because the subject-matter of claims 1-34 is not considered to be novel.

(a) D1 is considered to disclose a thermoplastic composition as described in the application claim 1.
The disclosures of D1 (column 1, line 1-8, 58-65, 21-29 ; column 3, line 7-35, 53-67 ; column 4, line 23-61 ; column 2, line 25-40 ; column 4, line 1-22 ; column 6, line 14-57 ; column 2, line 12-17 ; examples ; column 5, line 35 - column 6, line 9 ; claims 1-25) are considered to be novelty-attacking for the subject-matter of present claims 1,2,5-26,29-34

superabsorber, namely to absorb liquid. Typically, the final SAP is not water soluble due to the network of polymer strands which is achieved by crosslinking. Consequently, superabsorbers can not be built up from monomers which exhibit a substantial amount of water-insoluble components.

Clarity objections (Article 84 EPC)

The clarity objection raised in item 3(a) in combination with Rule 35(12) EPC should be rendered moot in view of the above-presented amendments of the description. Please note, that the value of 0,3 g/in^2 on page 11, line 2 has been converted into SI-units and the obvious calculation error, which was originally given in brackets, has been corrected (Rule 88 EPC).

The objection raised in item 3(b) of the Communication should also be rendered moot in view of the amended description.

With respect to the clarity objection in view of the term "0,9 % aqueous saline solution", Applicant respectfully submits that this term is clear to a person skilled in the art, because it does not make any technical sense to determine the amount of a solid in an aqueous solution by mols or even by volume. Thus, it is clear to a person skilled in the art, that the percentage used is used as weight percentages. In fact, this test is a standard test for the evaluation of the superabsorbent properties under "realistic" conditions, which is always performed with 0,9 % (w/w) saline solution as can be seen from the attached excerpt from the internet page "Vernetztes Studium Chemie" (see last paragraph on page).

If the Examiner considers it necessary to introduce "weight-percentage" in this term, the Applicant is prepared to do so.

VERNETZTES STUDIUM CHEMIE

Thema
- Enzyklopädie
- Chemie
- Makromolekulare
- Funktionspolymere
- Themenreisen

VLU
- Übersicht
- Superabsorber
- Poly(acrylsäure)
- Herstellung von Superabsorbern
- Anwendungen
- Weitere Anwendungen
- Übungsaufgaben

Anwendungen

Das mit Abstand größte Einsatzgebiet der Superabsorber sind Hygieneartikel wie Windeln oder Damenbinden.

Füllstoff für Windeln

Die Superabsorber-Eigenschaft macht Poly(acrylsäure) zu einem idealen Füllstoff für Windeln und andere Hygieneartikel. Das Polymer kann maximal das 1000-fache seines Gewichts an Wasser aufnehmen, wenn das Wasser vollkommen frei von gelösten Stoffen ist. Sein Absorptionsvermögen sinkt merklich in dem Maße, in dem die Ionenkonzentration im Wasser zunimmt, da die Ladungen der ionischen Gruppen im Polymer dadurch kompensiert werden. Daher können Windeln nur das 20- bis 30-fache an Urin aufsaugen, der ja bekanntlich salzhaltig ist.

Abb.1

Auch nach Aufnahme großer Flüssigkeitsmengen bleibt die Windel angenehm trocken, da die Flüssigkeit im Poly(acrylsäure)-Hydrogel gebunden ist.

Wegen des Salzgehaltes von Körperflüssigkeiten ist der Quellungsgrad von Superabsorbern in deionisiertem Wasser eine wenig aussagekräftige Größe für die Beschreibung ihrer Leistungsfähigkeit. Aus diesem Grund werden Standard-Quellungsmessungen zusätzlich mit einer 0.9-%igen (g/g) NaCl-Lösung durchgeführt, die etwa der Salzkonzentration in menschlichem Urin oder Blut entspricht.

European Examiner's Statement II 185 186

The examination is being carried out on the following application documents:

Description, Pages

2, 4	as originally filed			
1, 1a, 3, 5-15	received on	22.11.2005	with letter of	22.11.2005

Claims, Numbers

1-34	received on	22.11.2005	with letter of	22.11.2005

Article 123(2) EPC and 84 EPC

1. The amendments filed with the applicant's letter of date 22/11/05 appear to be allowable according to Article 123(2) EPC.
- The Examining Division is presently obliged to maintain the clarity objection made in point 3(c) of the communication of date 26/7/05 regarding the use and meaning of the term "0.9 % saline solution". The Examining Division considers that the chemical properties / composition of the saline solution, e.g. ionic strength etc., will directly effect and influence the measured gel times which are being claimed by the present application as a distiguishing technical feature of the applicant's compositions.
- The possible clarification of this said term as outlined in the last paragraph on page 8 of the applicant's letter of date 22/11/05 by further introducing "weight-percentage" such that the term reads as, "0.9% (w/w) saline solution gel time", would clarify the meaning of the said term, but it is presently considered that it would not be in accordance with Article 123(2) EPC as there appears to be no supported basis for this new subject-matter in the original application as filed.
- The Examining Division has also considered the applicant's argument based on the

European Associate's Response II

Maiwald
Patentanwaltsgesellschaft mbH

München
Hamburg
Düsseldorf
New York

2. Added matter - Article 123(2) EPC and clarity Article 84 EPC

2.1 The Examiner states under Item 1 of the Communication that the term "0.9 % saline solution" is unclear, however, the expression "0.9 % (w/w) would fulfil the requirements of Article 84 EPC but violates Article 123(2) EPC.

2.2 We concur with the Examiner's opinion that the expression "0.9 % (w/w)" is clear in the sense of Article 84 EPC. Contrary to the Examiner's opinion, the amendment is also in line with Article 123(2) EPC. Attention is drawn to page 10, lines 13 to 15 where it is stated that all parts, ratios, percents and amounts stated in the examples are by weight unless otherwise stated. Throughout the application, i.e. in the description as well as in the example section, the absorption capacity is determined for 0.9 % saline solution. Thus, considering the paragraph on page 10 and the fact that 0.9 % solution is used in the entire description, the person skilled in the art would readily recognise that the percentages given are weight percentages.

2.3 Therefore, the amendments undertaken in claims 9 to 11 do not violate the requirements of Article 123(2) EPC.

3. Novelty – Article 43 EPC

3.1 It is not clear as to whether the Examiner raises lack of novelty in view of all cited prior art documents (D1 to D5) only in view of D1. In any case, it is apparent that none of the cited prior art documents are novelty destroying for the new filed claim set for the following reasons.

3.2 Prior to dealing with all documents cited, it seems necessary to highlight some important features of claim 1.

18 198

Castillo Grau & Asociados
ABOGADOS

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
No. 04-060377- -00011-0000
Fecha: 2010-05-05 13:46:37 Dep: 2020 DIR.NUEVASCR
Tra: 11 PATENTEIYII Eve: 379 FASENACIONALII
Act: 444 RESPUESTAREQUE Folios: 12

Señores
DIVISIÓN DE NUEVAS CREACIONES
SUPERINTENDENCIA DE INDUSTRIA Y C
Bogotá, D.C.

Re.: Código 011-378-444
Expediente No. 04-60.377
Fase nacional de Solicitud
de Patente PCT
H.B. FULLER LICENSING & FINANCING, INC.

En relación con el expediente de la referencia y dando cumplimiento a la última providencia recaída sobre este asunto por medio del presente escrito me permito manifestarles lo siguiente:

1. Adjunto una nueva versión del capítulo reivindicatorio la cual se ha redactado de una manera diferente para e mejor y más claro entendimiento.
2. En esta nueva versión, en la Reivindicación 1 se le ha agregado la particula "un" antes de "polímero termoplástico" para un mejor entendimiento por parte del Examinador.
   Adicionalmente esta reivindicación se ha redactado de una forma más clara para hacer énfasis en que el valor "x" hace parte de la fórmula (A-B)x como un entero de al menos uno, para que los elementos siguientes no hagan parte de ese valor "x" sino parte de la composición termoplástica reivindicada.
3. Con relación a la necesidad de presentar un test universal para la capacidad de absorción mi representada informa que en la única jurisdicción donde se ha hecho referencia a este tema es en la solicitud europea. En efecto, el Examinador en Europa fue el único que tuvo una preocupación por la frase "solución salina de 0,9%", sin embargo este examinador no sostuvo que el método del test debía ser un método universal o que el método del test presentado fuera objetable.
   El Examinador europeo consideró que la frase "solución salina de 0,9%" carecía de claridad por cuanto una persona versada en esta materia no podría determinar si la cantidad de salinidad en la solución salina de 0,9% era basada en moles, volumen o peso.

4. En la primera respuesta el Examinador, los apoderados de la sociedad solicitante sostuvieron que no tendría sentido técnico determinar la cantidad de soluto en una solución acuosa por moles e incluso por volumen. Se afirmó que este test (el uso de solución salina de 0,9% (w/w)) es un test estándar para la evaluación de las propiedades superabsorbentes bajo condiciones "realísticas". Posteriormente citó un extracto de una página de internet cuyo título en alemán es "Vernetztes Studium Chemie" que establece que es común probar la absorbencia utilizando una solución salina de 0,9%. En otras palabras, es el uso de una solución salina de 0,9% que es estándar al momento de comprobar la absorbencia.
5. Posteriormente en una segunda acción, el Examinador europeo afirmó que ahora el término "solución salina de 0,9%" ya no carecía de claridad pero que la modificación de "solución salina de 0,9%" a "solución salina de 0,9% w/w" no se encontraba soportada en la descripción.
6. En la siguiente respuesta de la solicitante, se puso de presente que en la descripción se establece, antes de la presentación de los ejemplos, que "salvo indicación en contrario, todas las partes, relaciones, porcentajes y cantidades que se indican en los Ejemplos son por peso". De igual manera se anotó que a lo largo de todo el texto de la descripción, incluida la sección de los Ejemplos, la sociedad solicitante se refiere a solución salina acuosa de 0,9%. Luego de estas explicaciones el Examinador Europeo retiró sus objeciones y recientemente sostuvo que las reivindicaciones eran patentables.
7. Adjuntamos para referencia del Examinador copias de los documentos arriba mencionados.
8. Si estas explicaciones no satisfacen a la División adjuntamos una segunda versión del capítulo reivindicatorio de la cual se han retirado todas las reivindicaciones que hacen referencia a la solución salina de 0,9% para que sea concedida, por cuanto mi representada no conoce ninguna prueba universal sobre el particular diferente a la prueba indicada en la descripción.

En consecuencia, les solicito conceder el privilegio de patente de invención aquí tramitado.

De Ustedes Atentamente,

LUIS FELIPE CASTILLO GIBSONE
T.P. No. 69.995 del C.S.J.

05 MAYO 2010

189
190

REIVINDICACIONES:

1. Una composición termoplástica que comprende

de 1% por peso a 25% por peso de un polímero termoplástico que comprende

un copolímero de bloque con la fórmula (A-B)x o A-B-A, donde el bloque A comprende polivinilalareno, el bloque B comprende dieno conjugado, dieno hidrogenado, o una combinación de lo mismo, y x es un entero de al menos uno,

poliolefina amorfa,

poliolefina cristalina,

interpolímeros de etileno,

polibutileno,

poliacturo,

poli(hidroxi-butirato/hidroxivalerato),

alcohol polivinílico,

copoliésteres,

poliésteres,

poli(oxido de etileno) poliéter amida,

copolímeros de bloque de poliéster éter,

poliamidas

o una combinación de lo anterior;

de 45% por peso a 75% por peso de partículas esféricas de polímero superabsorbentes que comprenden poliacrilato y que tienen un diámetro de partícula promedio de entre 20 µm y 30 µm; y

un plastificante,

dicha composición exhibe una viscosidad no mayor de 65 Pas (65.000 centipoise) a 149°C (300°F)

2. La composición termoplástica de la reivindicación 1, que además comprende un surfactante.

3. La composición termoplástica de la reivindicación 1, que además comprende entre 1% por peso y 5% por peso de surfactante.

4. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3,que comprende entre 60% por peso y 75% por peso de dicho polímero superabsorbente.

5. La composición termoplástica de cualquiera de las reivindicaciones 1-3, en donde el copolímero de bloque es seleccionado del grupo consistente de estireno-isopreno-estireno, estireno-butadieno hidrogenado-estireno, estireno-isopreno hidrogenado-estireno, estireno-butadieno-estireno y combinaciones de lo anterior

6. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 2 minutos.

7. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 1 minuto.

8. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en solución salina de 0,9% no mayor de 4 horas.

9. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en solución salina de 0,9% no mayor de 10 minutos.

10. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en solución salina de 0,9% no mayor de 5 minutos.

11. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad absorbente de al menos 60 g agua/g de composición.

12. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad absorbente de al menos 70 g agua/g de composición.

13. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad absorbente de al menos 100 g agua/g de composición.

14. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad de al menos 25 g de solución salina de 0,9%/g de composición.

15. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe una capacidad de al menos 35 g de solución salina de 0,9%/g de composición.

16. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3 que además comprende un agente de adhesión o pegajosidad.

17. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 2 minutos y una fuerza tensora húmeda de al menos 2,3g/cm^2.

18. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 1,5 minutos, una viscosidad no mayor de 30,000 cps a 149 °C (300°F) y una fuerza tensora húmeda de al menos 6,2g/cm^2.

19. La composición termoplástica de cualquiera de las reivindicaciones 1 a 3, en donde dicha composición exhibe un tiempo de gel en agua no mayor de 2 minutos, y una capacidad de absorción de al menos 70 g agua/g de composición y al menos 10 g de solución salina de 0,9%/g de composición.

193 195 192

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES

2020
Bogotá, D. C., 28 de mayo de 2010

Doctor
Luis Felipe Castillo Gibsone
Representante **H. B. Fuller Company**

ASUNTO	Radicación No.	**04-60377**
	Trámite	011
	Evento	379
	Actuación	430
	Oficio	107153
	Folios	014

Patente de Invención [X] Patente de Modelo de Utilidad [ ]

Vía Nacional [ ]

Vía PCT (fase nacional) [X] Cap. I [ ] Cap. II [X]

No. Sol. Internacional **PCT/US03/02055**
Fecha de Presentación Internacional **14 de enero de 2003**

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

1. Documentos estudiados

1.1.	Descripción:	Folios:	4 a 16	tal como se radicó inicialmente
		Folios	77 a 89	tal como se modificó el 10 de julio de 2007
		Folios	123 a 135	tal como se modificó el 5 de agosto de 2009
		Folios	145 a 156	tal como se modificó el 7 de diciembre de 2009
1.2.	Reivindicaciones:	Folios	17 a 20	tal como se radicó inicialmente
		Folios	90 a 94	tal como se modificó el 10 de julio de 2007
		Folios	136 a 137	tal como se modificó el 5 de agosto de 2009
		Folios	161 a 162	tal como se modificó el 7 de diciembre de 2009
		Folios	178 a 180	tal como se modificó el 5 de mayo de 2010
		Folios	181 a 182	tal como se modificó el 5 de mayo de 2010

1.3. Dibujos: Folios 97 a 102 tal como se modificó el el 10 de julio de 2007
Folios 158 a 160 tal como se modificó el 7 de diciembre de 2009

1.4. Prioridad:

Fecha	15 de enero de 2002
País	Estados Unidos de América
Número	10/050375

1.5. Argumentos del solicitante Folios: 111 a 122
Folios: 142 a 143
Folios: 176 a 177

2. Modificaciones *(Artículo 34 D. 486 y Art. 22 Tratado PCT)*

Leídos los argumentos esgrimidos por el solicitante a partir del folio 176, **no se pueden aceptar las modificaciones realizadas por el solicitante** toda vez que ***amplían el objeto inicial de la solicitud***.

De acuerdo a lo establecido por el solicitante en el folio 176, para efecto de entender de forma correcta la reivindicación 1 el valor "x" hace parte de la fórmula (A-B)x como un entero de al menos uno, **pero que los elementos siguientes no hacen parte de ese valor "x" sino parte de la composición termoplástica reivindicada** (resaltado de la oficina.

En primer lugar la composición tal como la presenta el solicitante en el último capítulo reivindicatorio y según la aclaración hecha, no se encuentra en el capítulo descriptivo. Allí (en la descripción) se relaciona que lo pretendido proteger es una composición termoplástica que incluye

- entre 1% por peso y 25% por peso de un copolímero de bloque de la fórmula (A-B)x o A-B-A, donde el bloque A comprende polivinilareno, el bloque B comprende poli(monoalquileno) y x es un entero de al menos uno
- Entre 45% por peso y 75% por peso de polímero superabsorbente que incluye poliacrilato y que tiene un diámetro medio de partícula de 20 µm y 30 µm
- Entre 15 y 40% por peso de aceite plastificante

Opcionalmente puede tener

- 1 -5% de surfactante

La descripción nunca menciona que se pretendan proteger alguno de los componentes o alguna combinación de poliolefina amorfa, poliolefina cristalina, interpolímeros de etileno, polibutileno, polilacturo, poli(hidroxibutirato/hidroxivalerato), alcohol polivínilico, copoliésteres, poliésteres, poli(óxido de etileno), poliéter amida, copolímeros de bloque poliéster éter, poliamidas, el copolímero la fórmula (A-B)x o A-B-A, donde el bloque A comprende polivinilareno, el bloque B comprende poli(monoalquileno) y x es un entero de al menos uno. Lo que se considera para protección es una composición termoplástica que incluye

- entre 1% por peso y 25% por peso de un copolímero de bloque de la fórmula (A-B)x o A-B-A, donde el bloque A comprende polivinilareno, el bloque B comprende poli(monoalquileno) y x es un entero de al menos uno
- Entre 45% por peso y 75% por peso de polímero superabsorbente que incluye poliacrilato y que tiene un diámetro medio de partícula de 20 µm y 30 µm
- Entre 15 y 40% por peso de aceite plastificante
- Opcionalmente 1 -5% de surfactante.

Luego nada tiene que ver el nuevo capítulo y las explicaciones dadas por el solicitante con lo referido en el documento original.

En segundo lugar, en el documento de prioridad (anexado) no se encuentra lo referido por el solicitante en su memorial de mayo de 2010 ni lo enumerado en el nuevo capítulo reivindicatorio suministrado a esta oficina.

En tercer lugar, si bien en el documento publicado PCT existía una reivindicación independiente 34 que relacionaba los compuestos añadidos [poliolefina amorfa, poliolefina cristalina, interpolímeros de etileno, polibutileno, polilacturo, poli(hidroxibutirato/hidroxivalerato), alcohol polivínilico, copoliésteres, poliésteres, poli(óxido de etileno), poliéter amida, copolímeros de bloque poliéster éter, poliamidas], estos corresponden a una reivindicación independiente que nada tenía que ver con el resto de su solicitud y por la que se hizo saber al solicitante que existía falta de unidad de invención y era una reivindicación que no se podía estudiar.

En cuarto lugar, esta oficina requirió en varias oportunidades al solicitante por qué no era claro como el valor "x" tenía un listado de compuestos cuando debía ser un valor numérico. Hechas las aclaraciones por parte del solicitante a esta oficina en el memorial del 5 de mayo de 2010, se tiene que entonces ninguno de los capítulos reivindicatorios suministrados a esta oficina, posteriores a la presentación original, puede ser aceptado dado que todos ellos corresponden a una ampliación de la materia contenida originalmente, tal y como se mostró en líneas anteriores.

3. Estudio de la solicitud, Determinación del Estado de la Técnica y análisis de patentabilidad

De acuerdo a lo observado, **NO** es posible realizar un correcto estudio de la solicitud, una correcta **Determinación del Estado de la Técnica y Evaluación de los requisitos de patentabilidad.** El único capítulo reivindicatorio que puede ser tenido en cuenta en este momento es el objetado en los folios 17 a 20. El solicitante solo tendrá una última oportunidad para presentar un capítulo reivindicatorio correctamente redactado que no amplíe la materia contenida en la solicitud inicial.

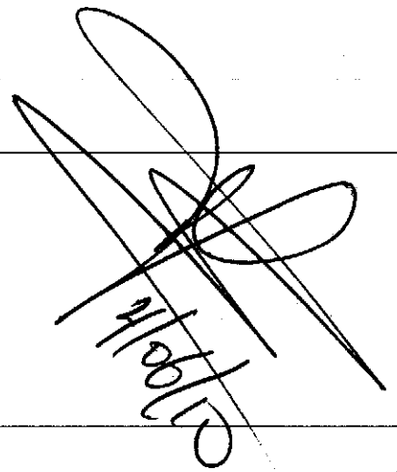
4. Conclusión:

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

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

Alix Carmenza Céspedes De Vergel
Directora de Nuevas Creaciones (C)

Concepto Técnico No. **1949**
Examinador Técnico **202003**
El anterior requerimiento fue notificado por fijación en lista, de fecha 04 JUN. 2010



SUPERABSORBENT THERMOPLASTIC COMPOSITION AND ARTICLE INCLUDING SAME

BACKGROUND OF THE INVENTION

The invention is directed to increasing absorbency in superabsorbent thermoplastic composition.

Water-insoluble, water swellable hydrogel-forming absorbent polymers, also referred to as superabsorbent polymers, are capable of absorbing large quantities of liquids such as water, body fluids (e.g., urine, blood), industrial fluids and household fluids and are further capable of retaining such absorbed liquids under moderate pressures.

Superabsorbent polymers are used in a variety of absorbent articles including, e.g., disposable diapers, feminine napkins, tissues, wipes and wound dressings. In many applications, the function of the absorbent article is to absorb and hold a relatively large volume of liquid, preferably as quickly as possible.

SUMMARY

In one aspect, the invention features a thermoplastic composition that includes from about 1 % by weight to 25 % by weight block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one, from about 45 % by weight to about 75 % by weight superabsorbent polymer particles that includes polyacrylate and having an average particle diameter of from 20 μm to 30 μm, and from about 15 % by weight to about 40 % by weight plasticizing oil. In one embodiment, the thermoplastic composition further includes surfactant. In another embodiment, the thermoplastic composition further includes from about 1 % by weight to about 5 % by weight surfactant. In some embodiments, the thermoplastic composition includes from 60 % by weight to about 75 % by weight the superabsorbent polymer. In one embodiment, the block copolymer is selected from the group consisting of styrene-isoprene-styrene, styrene-ethylene-butylene-styrene, styrene-ethylene-propylene-styrene, styrene-butadiene-styrene and combinations thereof.

In some embodiments, the composition exhibits a water gel time of no greater than 2 minutes, no greater than 1.5 minutes or no greater than 1 minute. In some embodiments, the composition exhibits a 0.9 % saline solution gel time of no greater than 4 hours, no greater than 1 hour, no greater than 25 minutes, no greater than 10 minutes or no greater than 5 minutes.

In another embodiment, the composition exhibits an absorbent capacity of at least 60 g water/g of composition, at least 70 g water/g of composition, at least 90 g water/g of composition at least 100 g water/g of composition or at least 110 g water/g of composition.

In some embodiments, the composition exhibits an absorbent capacity of at least 25 g 0.9 % saline solution/g of composition, at least 30 g 0.9 % saline solution/g of composition or at least 35 g 0.9 % saline solution/g of composition.

In one embodiment, the thermoplastic composition includes block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one, superabsorbent particles that includes polyacrylate and having an average particle diameter of from 20 μm to 30 μm and plasticizing oil, and the composition exhibits a water gel time of no greater than 2 minutes. In some embodiments, the block copolymer is selected from the group consisting of styrene-isoprene-styrene, styrene-ethylene-butylene-styrene, styrene-ethylene-propylene-styrene, styrene-butadiene-styrene and combinations thereof

In another embodiment, the thermoplastic composition includes block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one, superabsorbent particles that includes polyacrylate and having an average particle diameter of from 20 μm to 30 μm and plasticizing oil, and the composition exhibits a 0.9 % saline solution gel time of no greater than 1 hour.

In other embodiments, the thermoplastic composition includes block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one, superabsorbent particles that include polyacrylate and having an average particle diameter of from 20 μm to 30 μm and plasticizing oil and the composition exhibits an absorbent capacity of at least 70 g water/g of composition.

In some embodiments, the thermoplastic composition includes block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block

comprises poly(monoalkenyl), and x is an integer of at least one, superabsorbent particles that includes polyacrylate and having an average particle diameter of from 20 μm to 30 μm and plasticizing oil, and the composition exhibits an absorbent capacity of at least 25 g 0.9 % aqueous saline solution/g of composition.

In other embodiments, the thermoplastic adhesive composition that includes from about 1 % by weight to 25 % by weight block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one, from about 45 % by weight to about 75 % by weight superabsorbent polymer particles that includes polyacrylate and having an average particle diameter of from 20 μm to 30 μm, tackifying agent and from about 15 % by weight to about 40 % by weight plasticizing oil.

In another embodiment, the thermoplastic composition includes block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one spherical superabsorbent particles that includes polyacrylate and plasticizing oil, the composition exhibiting a water gel time of no greater than 2 minutes, a viscosity of no greater than 100,000 centipoise at 300°F and a wet tensile strength of at least 15 g/in^2. In one embodiment, the composition exhibits a 0.9 % saline solution gel time of no greater than 1 hour. In some embodiments, the composition exhibits a 0.9 % saline solution gel time of no greater than 10 minutes. In other embodiments, the composition exhibits a water gel time of no greater than 1.5 minutes, a viscosity of no greater than 30,000 centipoise and a wet tensile strength of at least 40 g/in^2. In another embodiment, the composition exhibits an absorption capacity of at least 70 g water/g composition.

In some embodiments, the thermoplastic composition includes from about 1 % by weight to 25 % by weight block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one, from about 45 % by weight to about 75 % by weight superabsorbent polymer particles that include polyacrylate, and from about 15 % by weight to about 40 % by weight plasticizing oil, the composition exhibiting a water gel time of no greater than 2 minutes, and an absorption capacity of at least 70 g water/g composition and at least 10 g 0.9 % saline solution/g composition.

In another aspect, the invention features an absorbent article that includes an absorbent core and an above-described composition incorporated in the absorbent core.

In one embodiment, the absorbent article that includes an absorbent core and an above-described composition disposed on the absorbent core.

In another aspect, the invention features an absorbent article that includes a liquid permeable sheet, a liquid impermeable barrier sheet, an absorbent element disposed between the liquid permeable sheet and the barrier sheet and an above-described thermoplastic composition disposed on at least one of the liquid permeable sheet, the barrier sheet and the absorbent element. In one embodiment, the absorbent article is selected from the group consisting of disposable diapers, sanitary napkins, wound care products, wipes, towels and tissues.

In one embodiment, the absorbent article includes a liquid permeable sheet, a liquid impermeable barrier sheet, an absorbent element disposed between the liquid permeable sheet and the barrier sheet and an above-described composition incorporated in the absorbent element.

The invention features a thermoplastic composition that exhibits a fast rate of absorption of water and aqueous saline solution, and a good absorption capacity for water and saline solution. The thermoplastic composition maintains good cohesive strength and adhesive integrity when wet, and exhibits a viscosity suitable for processing using standard hot melt equipment.

Other features of the invention will be apparent from the following description of the preferred embodiments thereof, and from the claims.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The thermoplastic composition includes block copolymer, superabsorbent particles that include superabsorbent polyacrylate polymer, and plasticizing oil. The thermoplastic composition preferably exhibits a gel time, when exposed to water, of no greater than 3 minutes, preferably no greater than 2 minutes, more preferably no greater than 1.5 minutes, most preferably no greater than 1 minute and an average gel time, when exposed to a 0.9 % aqueous saline solution, of no greater than 4 hours, preferably no greater than 1 hour, more preferably no greater than 25 minutes, most preferably no greater than 10 minutes, even more preferably no greater than 5 minutes.

The composition also exhibits an absorbent capacity of at least 60 g water/g composition, preferably at least 70 g water/g composition, more preferably at least 90 g water/g composition, more preferably at least 100 g water/g composition, most preferably at least 110 g water/g composition, and an absorbent capacity of at least 25 g 0.9 % aqueous saline solution/g composition, preferably at least 30 g 0.9 % aqueous saline solution/g composition, more preferably at least 35 g 0.9 % aqueous saline solution/g composition.

The thermoplastic composition exhibits cohesive strength when wet and preferably exhibits a wet tensile strength of at least 15 g/in^2, more preferably at least 40 g/in^2, most preferably at least 60 g/in^2.

The thermoplastic composition preferably exhibits a viscosity no greater than about 100,000 cPs, preferably from about 10,000 cps to about 85,000 cps, more preferably from about 15,000 cps to about 65,000 cps, most preferably from about 15,000 cps to about 30,000 cps at 300°F (149°C).

Suitable block copolymers include linear and radial copolymer structures having the formula (A-B)x, where block A is a polyvinylarene block, Block B is a poly(monoalkenyl) block, and x is an integer of at least one. Suitable block A polyvinylarenes include, e.g., polystyrene, polyalpha-methylstyrene, polyvinyltoluene and combinations thereof. Suitable B blocks include, e.g., conjugated diene elastomers including, e.g., polybutadiene and polyisoprene, hydrogenated elastomers, ethylene/butylene (hydrogenated butadiene) and ethylene/propylene (hydrogenated isoprene), and combinations and mixtures thereof. Useful commercially available block copolymers are available under the Kraton D and Kraton G series of trade designations from Shell Chemical Company (Houston, TX) including, e.g., Kraton G-1651, the Europrene Sol T series of trade designations from EniChem Elastomers (Houston, TX), the Vector series of trade designations from Exxon (Dexco) (Houston, TX), Soprene series of trade designations from Enichem Elastomers and Stereon series of trade designations from Firestone Tire & Rubber Co. (Akron, Ohio).

The amount of block copolymer present in the thermoplastic composition is no greater than 25 % by weight, preferably from about 1 % by weight to about 20 % by

weight, more preferably from about 1 % by weight to about 10 % by weight, most preferably from about 1 % by weight to about 7 % by weight.

Alternately, the composition may include amorphous and crystalline polyolefins including homogeneous and substantially linear ethylene/alpha-olefin interpolymers, interpolymers of ethylene such as ethylene-vinylacetate, ethylene-methyl acrylate and ethylene n-butyl acrylate, and mixtures thereof.

Amorphous polyolefins or amorphous polyalphaolefins are homopolymers, copolymers, and terpolymers of C_2-C_8 alphaolefins. Commercially available amorphous polyalphaolefins include REXTAC (t and REXFlext) propylene-based homopolymers, ethylene-propylene copolymers, butene-propylene copolymers available from Rexene (Dallas, Texas) and VESTOPLAST alpha-olefin copolymers available from Huls (Piscataway, New Jersey).

Metallocene polyolefins are homogeneous linear and substantially linear ethylene polymers prepared using single-site or metallocene catalysts. Substantially linear ethylene polymers are commercially available from Dow Chemical Company and include polyolefin plastomers available under the AFFINITY trade designation, homogeneous linear ethylene polymers are available from Exxon Chemical Company under the trade designation EXACT. Homogeneous linear and substantially linear ethylene polymers having a relatively low density, ranging from about 855 to about 885, and a relatively low melt index, for example less than about 50 g/10 min.

The term "interpolymer" is used herein to indicate a copolymer, terpolymer, or higher order polymer having at least one other comonomer polymerized with ethylene. Interpolymers of ethylene are those polymers having at least one comonomer selected from the group consisting of vinyl esters of a saturated carboxylic acid wherein the acid moiety has up to 4 carbon atoms, unsaturated mono-or dicarboxylic acids of 3 to 5 carbon atoms, a salt of the unsaturated acid, esters of the unsaturated acid derived from an alcohol having 1 to 8 carbon atoms, and mixtures thereof. The melt index of the interpolymers of ethylene may range from about 50 to about 2000, from about 100 to 1500, from about 200 to 1200, and from about 400 to 1200 g/10 min.

Examples of ethylene/unsaturated carboxylic acid, salt and ester interpolymers include ethylene/vinyl acetate, ethylene/acrylic acid and its ionomers,

ethylene/methacrylic acid and its ionomers, ethylene/methyl acrylate, ethylene/ethyl acrylate, ethylene/n-butyl acrylate, and derivatives thereof.

Other thermoplastic polymers include polylactide, e.g., caprolactone polymers, and poly (hydroxy-butyrate/hydroxyvalerate), certain polyvinyl alcohols, biodegradable copolyesters such as Eastman Copolyester 14766 (Eastman Chemical), linear saturated polyesters, examples of which are available under the trade designations DYNAPOL and DYNACOLL from Huls, poly(ethylene oxide) polyether amide and polyester ether block copolymers, examples of which are available under the trade designations PEBAX from Atochem and RITE-FLEX from Hoechst Celanese, and polyamide polymers, examples of which are available under the trade designations UNIREZ (Union Camp), VESTAMELT (Huls) and GRILTEX (EMS-Chemie).

The superabsorbent particles include superabsorbent polymer, which is also referred to as water-insoluble absorbent hydrogel-forming polymer, "hydrogel-forming" polymer and "hydrocolloid". Superabsorbent polymers have a water absorption capacity of from many times to 1000 times their own weight. Useful superabsorbent polymers include, e.g., crosslinked acrylate polymers, crosslinked products of vinyl alcohol-acrylate copolymers, crosslinked products of polyvinyl alcohols grafted with maleic anhydride, cross-linked products of acrylate-methacrylate copolymers, crosslinked saponification products of methyl acrylate-vinyl acetate copolymers, crosslinked products of starch acrylate graft copolymers, crosslinked saponification products of starch acrylonitrile graft copolymers, crosslinked products of carboxymethyl cellulose polymers and crosslinked products of isobutylene-maleic anhydride copolymers, and combinations thereof.

The superabsorbent particles preferably are spherical and have an average particle size of from about 20 μm to about 30 μm. The composition may include spherical superabsorbent particles having an average particle size of from 20 μm to 400 μm, from 200μm to 400 μm, from 250 μm to 390 μm and from 250 μm to 350μm.

Useful commercially available superabsorbent particles include, e.g., sodium polyacrylate superabsorbent particles available under the AQUA KEEP series of trade designations including, e.g., particles having an average particle size of from about 20 μm to about 30 μm available under the trade designation AQUA KEEP 10SH-NF, particles having an average particle size of from 200 μm to 300 μm available under the trade

designation AQUA KEEP 10SH-P, particles having an average particle size of from 320 μm to 370 μm available under the trade designation AQUA KEEP SA60S, particles having an average particle size of from 350μm to 390 μm available under the trade designations AQUA KEEP SA60SX, SA55SX II and SA 60SL II, and particles having an average particle size of from 250 μm to 350 μm available under the trade designation AQUA KEEP SA60N TYPE II from Sumitomo Seika Chemicals Col, Ltd. (Japan).

The amount of superabsorbent polymer present in the composition ranges from about 45 % by weight to about 75 % by weight, preferably from about 60 % by weight to about 75 % by weight, more preferably from about 65 % by weight to about 72 % by weight.

Useful plasticizing oils include, e.g., hydrocarbon oils low in aromatic content, mineral oil (e.g., Purity 35 mineral oil from PetroCanada Lubricants (Calgary, Canada)). Preferred plasticizing oils are paraffinic or naphthenic. Examples of suitable commercially available plasticizing oils are available under the trade designations Calsol 5555 from Calumet Refining Co. (Chicago, Illinois), and Benzolflex 352 from Velsicol, (Rosemont, Illinois).

The plasticizing oil is preferably present in the composition in an amount of from 15 % by weight to about 40 % by weight, more preferably from about 20 % by weight to about 30 % by weight, most preferably from about 25 % by weight to about 30 % by weight.

The thermoplastic composition may optionally include surfactant. Suitable surfactants include nonionic, anionic, and silicone surfactants. Preferred commercially available surfactants are available under the trade designations Aerosol OT 100 and Aerosol OT B (dioctyl ester of sodium sulfosuccinic acid), from Cytec Industries (West Paterson, New Jersey), and Rhodacal DS 10 (sodium dodecyl benzene sulfonated) from Rhone Poulenc (Cranberry, New Jersey).

When surfactant is present in the thermoplastic composition, the amount of surfactant is preferably no greater than about 5 % by weight, more preferably from about 1 % by weight to 5 % by weight, most preferably from about 1 % by weight to about 2 % by weight.

The thermoplastic composition can also include other additives including, e.g., tackifying agents, waxes, antioxidants, pigments and combinations thereof.

Examples of suitable tackifying agents include wood rosin, tall oil rosin, tall oil derivatives, gum rosin, rosin ester resins, natural terpenes, synthetic terpenes, and petroleum based tackifying agents including, e.g., aliphatic, aromatic and mixed aliphatic-aromatic petroleum based tackifying resins. Useful hydrocarbon resins include, e.g., alpha-methyl styrene resins, branched and unbranched C_5 resins, C_9 resins and C_{10} resins, styrenic and hydrogenated modifications thereof, and combinations thereof. Examples of useful commercially available tackifying resins include HL-1620-A, HL-2238 and HL-1500 thermoplastic adhesive available from H.B. Fuller Company (Vadnais Heights, Minnesota) and Zonatac 105 styrenated terpene resin from Arizona Chemicals Inc. (Panama City, Florida).

Tackifying agent may optionally be present in the composition. The amount of tackifying agent in the composition, when present, is preferably no greater than 40 % by weight, more preferably no greater than 30 % by weight.

The thermoplastic composition may be pelletized, or cast into molds or drums for subsequent processing including, e.g., remelting and application.

The thermoplastic composition is useful in a variety of forms including, e.g., coating, film, binder, fiber and woven and nonwoven webs. The thermoplastic composition can be applied to or incorporated in a variety of substrates including, e.g., woven and nonwoven webs, porous substrates, films, tape backings, absorbent articles including, e.g., disposable diapers, feminine napkins, medical dressings (e.g., wound care products) wipes, tissues, towels, sheets and components of absorbent articles including, e.g., absorbent cores, impermeable layers (e.g., backsheets), tissue (e.g., wrapping tissue), acquisition layers and woven and nonwoven web layers (e.g., top sheets, absorbent tissue), and combinations thereof.

The composition also has utility in applications including, e.g., moisture barriers (e.g., for optical cable applications), agricultural applications targeted at increasing humectancy, packaging (e.g., food and drug packaging) including components (e.g., sheets and tissues) for absorbing moisture and fluid (e.g., blood and juices), and building

materials for preventing condensation and waterproofing. The composition is also useful as cable sheathing including, e.g., sheathing for underwater cables.

Various application techniques can be used to apply the thermoplastic composition to a substrate including, e.g., slot coating, spraying including, e.g., spiral spraying and random spraying, screen printing, foaming, engraved roller, extrusion and meltblown adhesive application techniques.

The invention will now be described further by way of the following examples. All parts, ratios, percents and amounts stated in the Examples are by weight unless otherwise specified.

EXAMPLES

Test Procedures

Test procedures used in the examples include the following.

Absorption Capacity for Water

Total absorption is determined by drawing-down a molten film or heat-pressing the thermoplastic composition into a film having a thickness of 20 mils or a coating weight of approximately 0.3 g/in^2. The film is then cut into a 1 inch (2.54 cm) square and weighed. The sample film is then placed in a 50 ml cup and 30 ml of water (or more if needed) is poured on top of the film. After 30 minutes the unabsorbed water is filtered off and weighed. The total amount of water absorbed is determined and the grams (g) of water absorbed per gram of composition is recorded as g water/g composite.

Water Gel Time Method

The water gel time is determined by drawing-down a molten film or heat pressing the thermoplastic composition into a film having a thickness of 20 mils (i.e., a coating weight of approximately 0.3 g/in^2 (6.45 g/cm^2). The film sample is then cut into a 1 inch (2.54 cm) square and weighed. The sample is then placed in a 25 ml cup, and 10 ml of water is poured on top of the film. A stopwatch is started and the time it takes for gelation to occur (i.e., the amount of time it takes for all of the water to be absorbed by the sample) is reported in minutes (min).

Absorption Capacity for 0.9 % Aqueous Saline Solution

Total absorption capacity for 0.9 % saline solution is determined by drawing-down a molten film or heat-pressing the thermoplastic composition into a film having a thickness of 20 mils or a coating weight of approximately 0.3 g/in^2. The film is then cut into a 1 inch (2.54 cm) square and weighed. The sample film is then placed in a 50 ml cup and 30 ml (or more if needed) of 0.9 % aqueous saline solution is poured on top of the film. After 30 minutes the unabsorbed saline solution is filtered off and weighed. The total amount of 0.9 % aqueous saline solution absorbed is determined and the grams (g) of 0.9 % aqueous saline solution absorbed per gram of composition is recorded as g 0.9 % aqueous saline solution/g composite.

0.9 % Aqueous Saline Solution Gel Time

The gel time relative to 0.9 % aqueous saline solution is determined by drawing-down a molten film or heat pressing the thermoplastic composition into a film having a thickness of 20 mils or a coating weight of approximately 0.3 g/in^2. The film sample is then cut into a 1 inch (2.54 cm) square and weighed. The sample is then placed in a 25 ml cup, and 10 ml of 0.9 % aqueous saline solution is poured on top of the film. A stopwatch is started and the time it takes for gelation to occur (i.e., the amount of time it takes for all of the 0.9 % aqueous saline solution to be absorbed) is reported.

Viscosity

The viscosity of the sample is determined using a Brookfield Laboratories DVII+ Viscometer. The spindle used is a SC-27 hot-melt spindle suitable for measuring viscosities in the range of from 10 to 100,000 centipoise. The sample is placed in the in a disposable aluminum sample chamber, which, in turn, is inserted in to a Brookfield Thermosel and locked into place. The sample is heated to 300°F, with additional sample being added until the melted sample is about 1 inch (2.5 cm) below the top of the sample chamber. The viscometer apparatus is lowered and the spindle is submerged into the sample. The viscometer is turned on and set to a shear rate that leads to a torque reading in the range of from 30 % to 60 %. Readings are taken every minute for about 15 minutes or until the values stabilize. The final reading is recorded in centipoises (cps).

Wet Tensile Strength Determination

The sample composition is drawn out as a 20 mil thick film and 2 in. x 1 in. strips are cut from the film. Masking tape is applied to the terminal ½ in. of each end of each strip. The strip is soaked in 0.9 % saline solution for 5 minutes and then gently dried of excess liquid. Within one minute, the sample is placed between the grips of an Instron tester (Instron Corporation, Canton, Massachusetts). Tensile strength testing is conducted at a cross-head speed of 12 in/min and the average value obtained on for 5 samples strips is reported in units of grams.

Example 1-8

The thermoplastic compositions of each of Examples 1-8 were prepared by combining the components (other than the superabsorbent particles) in the amounts specified in Table 1 and heating the composition to about 300°F while mixing. Superabsorbent particles, in the amount specified in table 1, were then added to the molten thermoplastic composition with mixing.

The compositions of Examples 1-8 were tested to determine water gel time, 0.9 % aqueous saline solution gel time, absorbent capacity for water, absorbent capacity for 0.9 % aqueous saline solution and viscosity. The wet tensile strength of Examples 6-8 was also measured. The results are reported in Table 1.

Table 1

Example	1	2	3	4	5	6	7	8
Ingredients								
NW-1067[1]	52	44.5						
HL-1620-A[2]			45					
HL-2238[3]				45				
PB-8910[4]					15			
Zonatac 105[5]					15			
Calsol 5555 oil[6]					15		27	22.5
HL-1500[7]						33		
Kraton G-1651[8]							1.5	1.5
Rhodacal DS-10[9]			2	2	2	2	1	1
AquaKeep 10SH-NF[10]	48	55.5	53	53	53	65	70	75
Water Gel Time	>25 min	14.5 min	8.25 min	6 min	2.25 min	1.0 min	1.5 min	1.0 min
0.9% Saline Solution Gel Time	> 6 hrs	> 6 hrs	> 5 hrs	3.5 hrs	>20 min	9 min	5 min	10 min
Absorbent Capacity in water (g/g)	2.2	44	60	32	68	75	116	118
Absorbent Capacity in 0.9% Saline Solution (g/g)	2.7	5.2	24.5	9.9	24.7	21	35.5	37
Viscosity (cps) @ 300F	21,000	88,000	85,000	92,000	65,000	24,000	65,000	> 100,000
Wet Tensile Strength (g)	NT	NT	NT	NT	NT	49 g	Soft rubber nature	Soft rubber nature

NT = Not Tested

[1]NW-1067 styrene-isoprene-styrene block copolymer-based adhesive composition (H.B. Fuller Company).

[2]HL-1620-A styrene-isoprene-styrene block copolymer-based adhesive composition including hydrocarbon resin and plasticizer (H.B. Fuller Company).

[3]HL-2238 styrene-ethylene-butylene-styrene block copolymer-based adhesive composition including hydrocarbon resin and plasticizer (H.B. Fuller Company).

[4]DP-8910 polyethylene (Shell Chemical Company, Houston, Texas)

[5]Zonatac 105 styrenated terpene resin (Arizona Chemical, Panama City, Florida).

[6]Calsol 5555 naphthenic oil (Calumet Refining Co., Chicago, Illinois).

[7]HL-1500 styrene-isoprene-styrene block copolymer-based adhesive including hydrocarbon resin and plasticizer (H.B. Fuller Company)

[8]Kraton G-1651 styrene-ethylene-butadiene-styrene block copolymer (Shell Chemical Company)

[9]Rhodacal DS-10 sodium dodecylbenzene sulfonate (Rhone Poulenc, Cranberry, New Jersey).

[10]AquaKeep 10SH-NF superabsorbent particles having an average diameter of 20 to 30 um (Sumitomo Seika, Osaka, Japan)

10050375-011502

Other embodiments are within the claims.

What is claimed is:

1. A thermoplastic composition comprising:

from about 1 % by weight to 25 % by weight block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one;

from about 45 % by weight to about 75 % by weight superabsorbent polymer particles comprising polyacrylate and having an average particle diameter of from 20 μm to 30 μm; and

from about 15 % by weight to about 40 % by weight plasticizing oil.

2. The thermoplastic composition of claim 1, further comprising surfactant.

3. The thermoplastic composition of claim 21, further comprising from about 1% by weight to about 5 % by weight surfactant.

4. The thermoplastic composition of claim 1, comprising from 60 % by weight to about 75 % by weight said superabsorbent polymer.

5. The thermoplastic composition of claim 1, wherein the block copolymer is selected from the group consisting of styrene-isoprene-styrene, styrene-ethylene-butylene-styrene, styrene-ethylene-propylene-styrene, styrene-butadiene-styrene and combinations thereof

6. The thermoplastic composition of claim 1, wherein said composition exhibits a water gel time of no greater than 2 minutes.

7. The thermoplastic composition of claim 1, wherein said composition exhibits a water gel time of no greater than 1.5 minutes.

8. The thermoplastic composition of claim 1, wherein said composition exhibits a water gel time of no greater than 1 minute.

9. The thermoplastic composition of claim 1, wherein said composition exhibits a 0.9 % saline solution gel time of no greater than 4 hours.

10. The thermoplastic composition of claim 1, wherein said composition exhibits a 0.9 % saline solution gel time of no greater than 1 hour.

11. The thermoplastic composition of claim 1, wherein said composition exhibits a 0.9 % saline solution gel time of no greater than 25 minutes.

12. The thermoplastic composition of claim 1, wherein said composition exhibits a 0.9 % saline solution gel time of no greater than 10 minutes.

13. The thermoplastic composition of claim 1, wherein said composition exhibits a 0.9 % saline solution gel time of no greater than 5 minutes.

14. The thermoplastic composition of claim 1, wherein said composition exhibits an absorbent capacity of at least 60 g water/g of composition.

15. The thermoplastic composition of claim 1, wherein said composition exhibits an absorbent capacity of at least 70 g water/g of composition.

16. The thermoplastic composition of claim 1, wherein said composition exhibits an absorbent capacity of at least 90 g water/g of composition.

17. The thermoplastic composition of claim 1, wherein said composition exhibits an absorbent capacity of at least 100 g water/g of composition.

18. The thermoplastic composition of claim 1, wherein said composition exhibits an absorbent capacity of at least 110 g water/g of composition.

19. The thermoplastic composition of claim 1, wherein said composition exhibits an absorbent capacity of at least 25 g 0.9 % saline solution/g of composition.

20. The thermoplastic composition of claim 1, wherein said composition exhibits an absorbent capacity of at least 30 g 0.9 % saline solution/g of composition.

21. The thermoplastic composition of claim 1, wherein said composition exhibits an absorbent capacity of at least 35 g 0.9 % saline solution/g of composition.

22. A thermoplastic composition comprising:

block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one;

superabsorbent particles comprising polyacrylate and having an average particle diameter of from 20 μm to 30 μm; and

plasticizing oil,

said composition exhibiting water gel time of no greater than 2 minutes.

23. The thermoplastic composition of claim 22, wherein said block copolymer is selected from the group consisting of styrene-isoprene-styrene, styrene-ethylene-butylene-styrene, styrene-ethylene-propylene-styrene, styrene-butadiene-styrene and combinations thereof

24. A thermoplastic composition comprising:

block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one;

superabsorbent particles comprising polyacrylate and having an average particle diameter of from 20 μm to 30 μm; and

plasticizing oil,

said composition exhibiting a 0.9 % saline solution gel time of no greater than 1 hour.

25. A thermoplastic composition comprising:

block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one;

superabsorbent particles comprising polyacrylate and having an average particle diameter of from 20 μm to 30 μm; and

plasticizing oil,

said composition exhibiting an absorbent capacity of at least 70 g water/g of composition.

26. A thermoplastic composition comprising:

block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one;

superabsorbent particles comprising polyacrylate and having an average particle diameter of from 20 μm to 30 μm; and

plasticizing oil,

said composition exhibiting an absorbent capacity of at least 25 g 0.9 % aqueous saline solution/g of composition.

27. A thermoplastic adhesive composition comprising:

from about 1 % by weight to 25 % by weight block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one;

from about 45 % by weight to about 75 % by weight superabsorbent polymer particles comprising polyacrylate and having an average particle diameter of from 20 μm to 30 μm;

tackifying agent; and

from about 15% by weight to about 40% by weight plasticizing oil.

28. An absorbent article comprising:

an absorbent core;

the thermoplastic composition of claim 1 incorporated in said absorbent core.

29. An absorbent article comprising:

an absorbent core; and

the thermoplastic composition of claim 1 disposed on said absorbent core.

30. An absorbent article comprising:

a liquid permeable sheet;

a liquid impermeable barrier sheet;

an absorbent element disposed between the liquid permeable sheet and the barrier sheet; and

the thermoplastic composition of claim 1 disposed on at least one of said liquid permeable sheet, said barrier sheet and said absorbent element.

31. An absorbent article according to claim 32 selected from the group consisting of disposable diapers, sanitary napkins, wound care products, wipes, towels and tissues.

32. An absorbent article comprising:

a liquid permeable sheet;

a liquid impermeable barrier sheet;

an absorbent element disposed between the liquid permeable sheet and the barrier sheet; and

the thermoplastic composition of claim 1 incorporated in said absorbent element.

33. A thermoplastic composition comprising:

block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one;

spherical superabsorbent particles comprising polyacrylate; and

plasticizing oil,

said composition exhibiting a water gel time of no greater than 2 minutes, a viscosity of no greater than 100,000 centipoise at 300°F and a wet tensile strength of at least 15 g/in^2.

34. The thermoplastic composition of claim 34, wherein said composition exhibits a 0.9 % saline solution gel time of no greater than 1 hour.

35. The thermoplastic composition of claim 34, wherein said composition exhibits a 0.9 % saline solution gel time of no greater than 10 minutes.

36. The thermoplastic composition of claim 34, wherein said composition exhibits a water gel time of no greater than 1.5 minutes, a viscosity of no greater than 30,000 centipoise and a wet tensile strength of at least 40 g/in^2.

37. The thermoplastic composition of claim 34, wherein said composition exhibits an absorption capacity of at least 70 g water/g composition.

38. A thermoplastic composition comprising:

from about 1 % by weight to 25 % by weight block copolymer having the formula (A-B)x where the A block comprises polyvinylarene, the B block comprises poly(monoalkenyl), and x is an integer of at least one;

from about 45 % by weight to about 75 % by weight superabsorbent polymer particles that include polyacrylate; and

from about 15 % by weight to about 40 % by weight plasticizing oil,

said composition exhibiting a water gel time of no greater than 2 minutes, and an absorption capacity of at least 70 g water/g composition and at least 10 g 0.9% saline solution/g composition.

~~206~~ 205

SUPERABSORBENT THERMOPLASTIC COMPOSITION AND ARTICLE INCLUDING SAME

Abstract

A thermoplastic composition that includes from about 1 % by weight to 25 % by weight block copolymer having the formula (A-B)x where the A block includes polyvinylarene, the B block includes poly(monoalkenyl) and x is an integer of at least one, spherical superabsorbent particles comprising polyacrylate, and plasticizing oil, the composition exhibiting water gel time of no greater than 2 minutes, a viscosity of no greater than 100,000 centipoise and a wet tensile strength of at least 15 g/in^2.

10050375 - 011502