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Absorbent Article

The present invention relates to an absorbent article, and more specifically to an absorbent article in which at least part of a water-absorptive polymer is discontinuously bonded to a fibrous base material while wrapping the base material to thereby prevent the water-absorptive polymer from detaching from the fibrous base material and to maintain the absorption performance inherent in the water-absorptive polymer without detriment to the pliability inherent in the fibrous base material even after bonding of the water-



absorptive polymer, and which is suitably usable in
sanitary and medical articles such as sanitary napkins,
disposable diapers, and bandages as well as freshness-
keeping materials for vegetables, etc. and water-
5 retaining materials meeting the requirements of
absorption and retention of liquid in the fields of
agriculture, forestry, civil engineering, etc.

Water-absorptive polymers capable of absorbing
water in an amount tens to hundreds of times greater
10 than their own weight have been developed recently —————
and utilized in sanitary articles such as sanitary
napkins and paper diapers as well as water retention
and water absorption materials in the fields of
agriculture, forestry, and civil engineering.

15 The water-absorptive polymers now in use are
generally in granular form. Because of the granular
form, they are sandwiched between pieces of paper,
contact-bonded in the form of a mixture thereof with
pulp by embossing or the like, or heat-sealed with a
20 thermoplastic resin or the like to form composites in
most cases of their practical use. Thus, they are

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used after their form has been changed into sheets, films, or the like. However, even according to the method of forming such a composite, detachment of the polymer cannot be avoided. In the case of a heat-sealed composite in which detaching of the polymer is not frequent, since the polymer is coated therearound with a thermoplastic resin, contact of the polymer with a liquid such as water is blocked, disadvantageously resulting in extremely poor water absorption performance.

10 There have been many proposals of improving these defects to provide an absorbent article free from detachment of the polymer, such as those in the form of a film or a fiber. The absorbent article in film form is poor in absorption rate because of its small surface area, and is limited in pliability because of the presence of the planar polymer. On the other hand, the absorbent article in fiber form is poor in gel strength in a swollen state thereof though its pliability may be satisfactory. Thus, it is not necessarily true that absorbent articles good in

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absorption performance and free from detachment of the polymer have been obtained.

There has been other proposals involving a method comprising applying a water-soluble monomer capable of being converted into a water-absorptive polymer, such as (meth)acrylic acid or its salt, to a hydrophilic cellulose fiber base material, and subsequently polymerizing the monomer (Japanese Patent Publication No. 500,546/1982 and Japanese Patent Laid-Open No. 204,975/1984). Since the base material is hydrophilic, however, an aqueous solution of the monomer is so liable to penetrate into the inside of the fiber base material that the diameter of capillaries between filaments is reduced, leading to poor absorption performance, particularly poor absorption rate. Even when application is made on the surface of the base material without causing penetration into the inside thereof, the monomer is bonded and polymerized in a state of being wet-spread over the surface to frequently have a planar (web-like) _____ form. As a result, when the polymer is swollen with liquid, a blocking membrane is formed on the surface of the fiber to block penetration of the liquid into the inside of the absorbent article, leading to poor absorptivity. Accordingly, as early development of an

(14)

absorbent article having a good absorption performance and freedom from detachment of the polymer as possible has been required.

As a result of intensive investigations with a view to developing an absorbent article excellent in absorptivity and free from detachment of the polymer, the inventors of the present invention have found that an absorbent article having a configuration comprising a water-absorbent polymer bonded to a fibrous base material in such a state that at least part of the water-absorbent polymer wraps the fibrous base material in the form of substantial spheres discontinuously bonded to the base material can fully exhibit the absorption performance of the polymer particles and is substantially free from falling off of the polymer even when swollen. Thus, they have completed the present invention.

An absorbent article according to the invention comprises a base material of fibres, some or all of the fibres being hydrophobic; and a water-absorbent polymer, some or all of the polymer being in the form of substantially spherical or ellipsoidal particles bonded

to fibres of the base material; the polymer particles having been formed by applying drops of monomer to the fibres, so that the drops envelope individual fibres, and then polymerizing the monomer.

The polymer particles contained in the article in accordance with the invention are fixed onto the hydrophobic fibres to surround the hydrophobic fibres in the cross section. As a result, the fibres appear to insert into the polymer particles the polymer particles are scattered throughout the base material so as to be discrete and discontinuous from one to another.

Preferred features of the invention are introduced below.

The fibres may comprise 5% or greater, more preferably 50% or greater by weight of hydrophobic fibres. The hydrophobic fibres consist of filaments having an advancing contact angle against 1 cc of water of greater than 50 to less than 100°. They may be selected from polyester fibres, polypropylene fibres and conjugated fibres of polyethylene and polypropylene.

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The absorbent article in accordance with the invention can be obtained by a process which comprises the steps of applying an aqueous solution of a water-soluble, ethylenically unsaturated monomer to the fibres of a base material, some or all of which fibres are hydrophobic, so that a portion of the solution bonds as drops to the fibres, polymerizing said monomer to produce a water-absorbent polymer, a portion or all of which is in the form of substantially spherical or ellipsoidal particles bonded to said fibres, and drying the resulting article.

10 The absorbent article is, in other words,
defined as an article comprising a fibrous base material and a water-absorptive polymer bonded to said base material, while at least part of said water-absorptive polymer wraps said base material in the form
15 of substantial spheres discontinuously bonded to the base material.

The polymer to use in the invention is water-insoluble.

The absorbent article of the present invention can be obtained according to a method comprising the following steps (1), (2), and (3).

(1) An aqueous solution of a water-soluble, ethylenically unsaturated monomer capable of being converted into an water-absorbent polymer is applied to a fibrous base material containing a hydrophobic fiber therein to produce a composite having aqueous monomer droplets discontinuously distributed with at least part of the droplets wrapping the fibrous base material.

(2) The monomer in the composite is then converted into a water-absorptive polymer in an atmosphere conducive to polymerization by a known _____ polymerization method to obtain an aqueous water-absorbent composite.

(3) Subsequently, the water-absorbent composite produced is dried to produce the desired absorbent article.

The configuration of the fibrous base material is important in providing such a state that at least part of water-absorptive polymer particles wraps the fibrous base material. Specifically, incorporation of a hydrophobic fiber into a web of the fibrous base material gives such a hydrophobic nature to the fibrous base material that it can provide together with a surface

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tension a state of wholly wrapping the fibre in the form of substantial spheres (spheres or ellipsoids) when an aqueous monomer solution is applied to the fibrous base material. The fibrous base material capable of providing such a state contains 5 wt.% or more of a hydrophobic fibre of greater than 50 to less than 100°, preferably 60 to 95° in advancing contact angle of its filaments against water, namely contact angle of them against lcc of an ion-exchanged water droplet. Usable hydrophilic fibres include polyester, polypropylene, conjugated polyethylene-polypropylene fibres. Those base materials mainly containing a hydrophobic fibre as mentioned just above are preferred. Instead of such a hydrophobic fibre a hydrophilic fibre, such as rayon, converted into a hydrophobic one by application to the surface thereof of a sizing agent of, for example, a rosin type or an alkylketene dimer type, a cationic surface active agent, may be used.

An aqueous monomer solution is applied on the fibrous base material having the above-mentioned configuration, and is subjected to polymerization to provide a state wherein polymer particles firmly wrap the fibre. Thus, an absorbent article substantially free from falling off of the polymer even when swollen is obtained. The distribution of the polymer in the

form of substantial spheres (spheres or ellipsoids) enlarges the surface area of the polymer per mass. Besides, the absence of a planar continuous polymer allows the absorptivity of the polymer in the

5 absorbent article to be sufficiently exhibited. Thus, a higher absorptivity can be secured all the more. When a hydrophobic fiber having a contact angle of 100° or more against water is used, the water repellency of the fiber is too large, with the result that the

10 polymer particles cannot show a state of wrapping the fiber but merely exist independently on the surface of the fiber or between the filaments though they are formed into spheres. When a fiber having a contact angle of 50° or less is used, the aqueous monomer

15 solution is wet-spread over the fiber so that the purpose of the present invention cannot be attained.

Any water-soluble, ethylenically unsaturated monomer can be used as one to be applied on the fibrous base material having portions of a hydrophobic

20 fiber in so far as it can be converted into a water-absorptive polymer and provide a good absorption performance after dried. In general, a water-soluble, ethylenically unsaturated monomer capable of providing such a performance has a functional group derived from

25 a carboxylic acid or its salt, phosphoric acid or its

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salt, or a sulfonic acid or its salt. Specific examples of such a monomer include (meth)acrylic acid and its salts, vinylsulfonic acid and its salts, and vinylphosphonic acid and its salts. (Meth)acrylic acid and its salts are preferred. The polymer to be obtained may be either a homopolymer or copolymer of a monomer(s) as mentioned above or a graft polymer of starch or cellulose with a monomer as mentioned above.

10 In order to improve the absorption performance, a crosslinking agent or an additive may be added to the monomer. Crosslinking agents that may be used are preferably water-soluble compounds having two or more functional groups capable of reacting with a functional group of a carboxylic, phosphoric, sulfonic acid, ———— specific examples of which include water-soluble polyfunctional, ethylenically unsaturated monomers such as methylenebisacrylamide, ethylene glycol di(meth)acrylate, and polyethylene glycol di(meth)acrylate; polyglycidyl ethers such as ethylene glycol diglycidyl ether and polyethylene glycol diglycidyl ether; polyols such as glycerin and pentaerythritol; and polyamines such as ethylenediamine.

25 Examples of additives include finely divided fillers such as talc, clay, and diatomaceous earth.

(21)

Any technique may be employed as the method of applying the above-mentioned aqueous monomer solution to the fibrous base material having portions of a hydrophobic fiber in so far as it can provide a manner and amount of application leading to such a state that at least part of the water-absorptive polymer wraps, in the form of discontinuous entities, the fibrous base material. For example, a known printing technique such as a screen or gravure printing technique, an atomizing or spraying technique with a spray, _____ be employed. In order to increase the efficiency of application, a polymerization-inactive viscosity modifier or a foaming agent may be employed. Pattern printing adapted to the use of the absorbent article may be performed.

The aqueous monomer solution applied to the fibrous base material having portions of the hydrophobic fiber is polymerized according to a known method to be converted into a water-absorptive polymer. Thus, an absorbent article is formed. The polymerization is possible with, for example, heat, light, accelerated electron beams, radiation, ultraviolet rays. _____

_____ In order to allow the polymerization to proceed rapidly and quantitatively, it is desired to effect the polymerization in a polymerization-inactive atmosphere



such as a nitrogen stream. It is necessary to add a water-soluble radical polymerization initiator, in thermal polymerization, or a water-soluble initiator capable of generating radicals with the aid of light or ultraviolet rays, in photopolymerization or ultraviolet polymerization, to the aqueous monomer solution. After polymerization, the resulting aqueous absorbent article may be dried by means of hot air, microwaves, or infrared rays.

10 In the absorbent article of the present invention, since rigid portions formed by polymer particles are discontinuously distributed on the fibrous base material due to discontinuous bonding of the polymer particles in a state of wrapping the fiber, the production of the absorbent article is achieved without detriment to the touch of the article including the pliability which is inherent in the fibrous base material. Thus, it can be favorably utilized in sanitary and medical articles.

20 The absorbent article of the present invention, which is formed by applying an aqueous solution of an unsaturated monomer to a fibrous base material containing at least partially a hydrophobic fiber and polymerizing the monomer, is markedly reduced in falling off of the polymer from the base material

since the water-absorptive polymer is discontinuously bonded on and around the surface of the fiber of the base material in the form of spherical or ellipsoidal beads while wrapping the fiber without wet-spreading on the fiber of the base material. Since the polymer is not planar but finely spherical, the surface area of the polymer per mass is so large that the absorption capacity and rate of the polymer are considerably improved compared with conventional ones.

The proportion of the polymer bonded in the form of frog's webs and the polymer bonded in the form of beads, and the size of polymer granules can be varied or controlled by varying the proportion of the hydrophilic and hydrophobic fibers in the fiber web of the base material. The absorption performance can be varied depending on the properties required of products. The interpolymer distance, bonding density, and particle size of the polymer can be varied by varying spaces in the fiber web of the base material. Since swelling spaces of the polymer can be varied thereby, the absorption performance of the polymer can be controlled. The amount and position of the polymer applied can be varied pattern-wise when the monomer is applied by printing. ————— This allows the function of the polymer to be more efficient if only



the amount of the polymer applied is varied pattern-wise in accordance with respective positions corresponding to a portion where a large amount of liquid is to be retained and other portion in the case of a diaper, a
5 sanitary napkin, etc.

A better feel with a good pliability and without a rough touch can be secured unlike those having a planar polymer, namely a small number of large knots. This is due to a configuration having a large number of small
10 knots which is materialized by the alternate occurrence of rigid portions of the polymer and non-rigid portions of the fiber itself at short intervals. This is possible since spheres of the polymer can be discontinuously bonded in the form of beads. In view
15 of this, when a good feel with a good pliability is necessary, a large amount of a hydrophobic fiber has only to be incorporated, while, when nerve is necessary, a large amount of hydrophilic fiber has only to be incorporated.

The absorption performance required of a product is different depending on the kind of product, e.g., a paper diaper or a sanitary napkin. The absorption capacity of, for example, a diaper can be increased by
5 using a base material containing 90 % or more of a hydrophobic fiber. On the other hand, for example, a sanitary napkin, which may have a small liquid absorption capacity, may comprise a base material mainly composed of a hydrophilic fiber such as
10 rayon. Nerve can be secured by incorporating, for example, 30 % or more of a hydrophilic fiber.

A laminate of a hydrophilic fiber web and a hydrophobic fiber web in two layers can also be used. In this case, a gradient of wettability is set between
15 the upper and lower layers of the base material. This can be utilized for facilitating diffusion of liquid or for providing a difference in absorption performance between the upper and lower portions. Thus, the versatility of the absorbent article is broadened.
20 Accordingly, the absorbent article can also be well adapted to any of various purposes by varying the configuration of the base material.

The invention article is unexpectedly improved in respect to feeling of touch to the skin of a user
25 thereof.

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Brief Description of the Drawings:

Figs. 1, 2, and 3 are electron microscope photographs of the absorbent articles by spraying a monomer on the fiber webs (A), (B), and (C), respectively.

The following examples will further illustrate the present invention in detail.

Example 1

An aqueous sodium acrylate solution having a solids content of 40 wt.% and a degree of neutralization of 70 mol % was prepared. 1 wt. % (based on the sodium acrylate monomer) of sodium persulfate and 500 ppm (based on the sodium acrylate monomer) of methylenebis-acrylamide were dissolved in the solution. Thereafter, a nitrogen gas was blown into the solution to remove the dissolved oxygen therefrom. The resulting solution was uniformly sprayed on a hydrophobic fibre web (A)

consisting of only a conjugated polyethylene-polypropylene fiber (ES fiber), a fiber web (B) consisting of equal weights of a conjugated polyethylene-polypropylene fiber (ES fiber) and rayon, and a hydrophilic fiber web
5 (C) consisting of only pulp, each having a basis weight of 45 g/m^2 , with a spray to respectively provide a basis weight of 150 g/m^2 (amount of polymer applied: 60 g/m^2). The web (C) was used as a control.

The webs coated with the monomer were allowed to
10 stand in an oven of 70°C completely purged with nitrogen for 20 minutes to effect polymerization. Thereafter, the resulting composites were dried under reduced pressure at 100°C to produce absorbent articles. Figs. 1 to 3 show electron microscope photographs of
15 the obtained samples. Figs. 1, 2, and 3 are the electron microscope photographs of the absorbent articles obtained by spraying the monomer on the fiber webs (A), (B), and (C), respectively.

As is apparent from these figures, the web (A)
20 predominantly comprised portions where the polymer was discontinuously bonded in the form of beads to the fiber,

while the web (C) mainly comprised portions where the polymer was bonded in a state of being wet-spread like frog's webs. Accordingly, the form of bonding of the polymer can be controlled by controlling the hydrophilic-hydrophobic balance of the fiber of the base material.

These absorbent articles were immersed in a sufficient amount of an isotonic sodium chloride solution, and allowed to stand for 10 minutes. Thereafter, they were allowed to stand on an 80-mesh metallic gauge till dropping of water droplets stopped, and then weighed. The same procedure was repeated as to a base material having the same area as in the above case and no polymer, followed by weighing. The absorption capacity of the polymer was calculated from these weights according to the following formula:

$$\text{absorption capacity (g/g)} = \frac{W_1 - W_0}{W}$$

W: amount of bonded polymer (g)

W₁: weight of absorbent article after water absorption (g)

W₀: weight of base material after water absorption (g)

The absorption capacities of the obtained absorbent articles are as follows:

one having the fiber web (A): 44 g/g

one having the fiber web (B): 36 g/g

5 one having the fiber web (C): 20 g/g

It can be understood from the above results that the absorption performance can be improved by the presence of the polymer in the form of beads.

Example 2

10 Polymerization was performed in substantially the same manner as in Example 1 except that an aqueous sodium vinylsulfonate solution having a solids content of 35 % and a degree of neutralization of 100 %, and 500 ppm of polyethylene glycol diacrylate (trade
15 name: NK Ester A-600 manufactured by Shinnakamura Kagaku K.K.) were used instead of the aqueous sodium acrylate solution and methylenebisacrylamide, respectively.

The absorption capacities of the obtained
20 absorbent articles are as follows:

one having the fiber web (A): 42 g/g

one having the fiber web (B): 35 g/g

one having the fiber web (C): 26 g/g

Example 3

25 An aqueous potassium acrylate solution having a

solids content of 45 wt.% and a degree of neutralization of 70 % was prepared. A nitrogen gas was blown into the aqueous monomer solution to remove the dissolved oxygen therefrom. 65 g/m² (amount of polymer applied: 5 29 g/m²) of the above-mentioned solution was applied on the same fiber webs (A), (B), and (C) as in Example 1 by the screen printing technique.

The resulting coated composites were irradiated with 5 Mrad of electron beams emitted from an EB 10 irradiation apparatus (manufactured by Nisshin High Voltage Company) in a nitrogen atmosphere at 150 kV. Thereafter, they were dried to obtain absorbent articles.

The absorption capacities of the obtained absorbent articles are as follows:

- 15 one having the fiber web (A): 30 g/g
 one having the fiber web (B): 27 g/g
 one having the fiber web (C): 15 g/g

Example 4

Polymerization was performed in substantially the 20 same manner as in Example 1 except that an aqueous sodium vinylphosphonate solution having a solids content of 20 wt.% and a degree of neutralization of 100 % was used instead of the aqueous sodium acrylate solution.

(31)

The absorption capacities of the obtained absorbent articles are as follows:

one having the fiber web (A): 43 g/g

one having the fiber web (B): 34 g/g

5 one having the fiber web (C): 23 g/g

Example 5

Absorbent articles were prepared by varying the polymerization and application conditions as well as the type of base material as listed in Table 1. As to
10 each obtained sample, the form of bonding of the polymer, the absorption capacity, the variation in the head beofre and after polymerization, and the degree of falling off of the polymer were examined. The results are shown in Table 1.

15 The form of bonding of the polymer was observed with an electron microscope. The absorption capacity was examined in the same manner as in Example 1. The variation in the hand before and after polymerization was examined by measuring the cantilever value of the
20 base material before and after polymerization (in accordance with JIS L1085 57A) and finding a difference in the value therebetween, which was regarded as a measure of hand loss. More specifically, as the difference was larger, the hand was lost more by
25 bonding of the polymer.



The test for the degree of detachment of the polymer after swelling was conducted by putting a sample into a large amount of an isotonic sodium chloride solution, allowing the polymer to sufficiently swell, stirring them for 5 minutes, and subsequently measuring the weight of polymer detached from the base material, followed by calculation of the weight of the fallen-off polymer according to the following formula:

$$\text{amount of polymer fallen off (wt.\%)} = \frac{\text{weight of polymer fallen off (g)}}{\text{weight of polymer (g)}} \times 100$$

Table 1

Sample No.	Monomer	Crosslinking agent	Application conditions		Polymerization method	Base material		Form	Absorption capacity (g/g)	Difference in cantilever value before and after polymerization (mm)	Amount of polymer fallen off after swelling (wt%)	Remarks
			Method	Amount of application (g/m ²)		Hydrophobic fiber (wt%)	Hydrophilic fiber (wt%)					
1	sodium acrylate	methylene-bisacrylamide	spraying	65	thermal polymerization	ES (100)	-	beads	44	4	2	
2	sodium acrylate	ethylene glycol diglycidyl ether #1	spraying	65	thermal polymerization	ES (100)	-	beads	43	5	1	
3	sodium acrylate	polyethylene glycol diacrylate #2	spraying	65	thermal polymerization	ES (100)	-	beads	46	2	1	
4	sodium acrylate	methylene-bisacrylamide	spraying	65	thermal polymerization	ES (50)	rayon (50)	beads + frog's webs	36	18	5	
5	sodium acrylate	methylene-bisacrylamide	spraying	65	thermal polymerization	ES (50); PET (50)	-	beads	46	3	2	
6	sodium acrylate	methylene-bisacrylamide	spraying	65	thermal polymerization	-	pulp (100)	frog's webs	20	50	15	comparative
7	potassium acrylate	-	screen printing	65	EB irradiation	ES (100)	-	beads	42	4	3	24
8	potassium acrylate	-	screen printing	65	EB irradiation	ES (50)	rayon (50)	beads	35	16	7	
9	potassium acrylate	-	screen printing	65	EB irradiation	-	pulp (100)	frog's webs	26	48	14	comparative
10	sodium vinylsulfonate	polyethylene glycol diacrylate #2	spraying	65	thermal polymerization	ES (100)	-	beads	44	2	3	
11	sodium vinylsulfonate	polyethylene glycol diacrylate #2	spraying	65	thermal polymerization	ES (15)	rayon (85)	beads + frog's webs	34	10	6	
12	sodium vinylsulfonate	polyethylene glycol diacrylate #2	spraying	65	thermal polymerization	-	pulp (100)	frog's webs	23	53	18	comparative
13	sodium vinylphosphonate	methylene-bisacrylamide	spraying	65	thermal polymerization	ES (100)	-	beads	43	6	2	
14	sodium vinylphosphonate	methylene-bisacrylamide	spraying	65	thermal polymerization	ES (50)	rayon (50)	beads + frog's webs	34	18	4	
15	sodium vinylphosphonate	methylene-bisacrylamide	spraying	65	thermal polymerization	-	pulp (100)	frog's webs	19	58	13	comparative

Table 1 (continued)

16	sodium acrylate	methylene-bisacrylamide	gravure printing	65	EB irradiation	ES (90). PP (10)	-	beads	45	3	1
17	sodium acrylate	methylene-bisacrylamide	gravure printing	65	EB irradiation	ES (70)	rayon (30)	beads + frog's webs	38	21	3
18	sodium acrylate	methylene-bisacrylamide	gravure printing	65	EB irradiation	ES (5)	rayon (95)	beads + frog's webs	30	26	7

Note) *1: trade name, Denakol EX810 manufactured by Nagase & Co., Ltd.

*2: trade name, NK Ester A-600 manufactured by Shinnakamura Kagaku K. K.

In the table, pp is polypropylene fibers, ES is conjugated fibers of polyethylene and polypropylene, and PET is polyethylene terephthalate.

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CLAIMS

1. An absorbent article which comprises a base material of fibres, some or all of the fibres being hydrophobic; and a water-absorbent polymer, some or all of the polymer being in the form of substantially spherical or ellipsoidal particles bonded to fibres of the base material; the polymer particles having been formed by applying drops of monomer to the fibres, so that the drops envelope individual fibres, and then polymerizing the monomer.
2. An absorbent article according to Claim 1 which comprises 5 or more percent by weight of hydrophobic fibres.
3. An absorbent article according to Claim 1 or 2 which comprises 50 or more percent by weight of hydrophobic fibres.
4. An absorbent article according to any preceding claim in which said hydrophobic fibres consist of filaments having an advancing contact angle against 1 cc water of greater than 50 to less than 100°.
5. An absorbent article according to Claim 4 in which said contact angle is from 60-95°.



(36)

6. An absorbent article according to any preceding claim in which said hydrophobic fibres are selected from polyester fibres, polypropylene fibres and conjugated fibres of polyethylene and polypropylene.
7. An absorbent article as claimed in any preceding claim in which said hydrophobic fibres consist of hydrophilic fibres which have been surface treated to become hydrophobic.
8. An absorbent article as claimed in claim 1, in which said base material comprises a layer of hydrophilic fibres and another layer of hydrophobic fibres.
9. An absorbent article according to any preceding claim in which the water absorbent polymer is formed from acrylic acid, methacrylic acid, vinylsulfonic acid, vinylphosphonic acid and salts thereof.
10. A process for producing an absorbent article which comprises the steps of applying an aqueous solution of a water-soluble, ethylenically unsaturated monomer to the fibres of a base material, some or all of which fibres are hydrophobic, so that a portion of the solution bonds as drops to the fibres,



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polymerizing said monomer to produce a water-absorbent polymer, a portion or all of which is in the form of substantially spherical or ellipsoidal particles bonded to said fibres and drying the resultant article.

11. A process as claimed in Claim 10, in which said monomer is selected from acrylic acid, methacrylic acid, vinylsufonic acid, vinylphosphonic acid and salts thereof.

12. A process according to Claim 10 or 11 which further comprises adding a cross linking agent to said aqueous monomer solution.

