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(54) **A process for preparing articles from a latex comprising water and a styrenic block copolymer and such a latex.**

(57) Articles are prepared from a latex comprising water and a styrenic block copolymer, wherein the styrenic block copolymer has 2 or more poly(vinyl aromatic) blocks and at least one block of polymerized conjugated diene, wherein the styrenic block copolymer has a weight average molecular weight of 150,000 to 250,000, the poly(vinyl aromatic) blocks have a weight average molecular weight ranging from 9,000 to 15,000, and the content of poly(vinylaromatic) blocks in the styrenic block copolymer ranges from 8 to 15 %wt, based on the total styrenic block copolymer, by a process which comprises coating a surface with the latex to obtain a film, wherein the latex comprises a vulcanising agent. The invention also provide for a latex comprising such a styrenic block copolymer and a vulcanising agent.

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A process for preparing articles from a latex comprising water and a styrenic block copolymer and such a latex

The present invention relates to a process for preparing articles from a latex comprising water and a styrenic block copolymer and to such a latex. In particular, the present invention relates to a process for preparing articles from a latex that comprises a particular styrenic block copolymer and wherein a surface is coated with the latex to obtain a film from which a thin article can be obtained.

Natural rubber latex concentrates have been used for the manufacturing of rubber-dipped articles, adhesives, rubber thread, foam rubber etc. Natural rubber latex is in particular used for the manufacture of dipped articles such as: household gloves, examination gloves, industrial gloves, surgical gloves, catheters, teats and soothers, breather bags, tubing, balloons and condoms. When these articles are made by dipping it means that a surface or mould is dipped into the latex, thereby obtaining a coating of the rubber on the surface or on the mould.

Synthetic latices based on isoprene rubber are a very convenient replacement for natural rubber, as they do not suffer from the various allergens found in natural rubber. On the other hand, the production of high quality isoprene rubber and latices thereof is not easy. It thus remains of interest to find a synthetic latex that is relatively easy to make, free of allergens, that may be used for the preparation of dipped articles, and gloves, catheters and condoms in particular, with an improved balance of properties.

Moreover, it is important that the articles made of synthetic rubber have a sufficiently high strength. For instance, in WO 2007/017368 it is described that one difficulty in the field of gloves for example, is the production of thin elastomeric articles having a high tensile strength. The solution that was found in WO 2007/017368 was the use of a specific vulcanization package that ensured that dipped articles from isoprene rubbers could be obtained with satisfactory tensile strength.

This was a major improvement since the requirements for unaged surgical gloves dipped from natural rubber and synthetic rubber latices are specified in ASTM D3577. The mechanical requirements are tensile strength, ultimate elongation and stress at 500% elongation (also referred to as 500% modulus) measured according to ASTM D412. These requirements are listed in the table 1 below.

Table 1: requirements for surgical gloves

Type	Tensile strength minimum value	Ultimate elongation minimum value	Stress at 500% elongation maximum value
I (natural rubber)	24 MPa	750%	5.5 MPa
II (synthetic rubber)	17 MPa	650%	7.0 MPa

High-strength films prepared from aqueous dispersions of block copolymers of vinyl aromatic monomers and conjugated dienes are known from US 5563204. It describes an aqueous dispersion comprising one or more block copolymers of the formula A-B-Xm-(B-A)n wherein each A polymer block consists essentially of a monovinylidene aromatic monomer, such as styrene, and each B block consists of a conjugated diene, such as isoprene. The blocks A have a weight average molecular weight from 8,000 to 15,000, each block B has a weight average molecular weight of 30,000 to 200,000, and the average A block content in the block copolymer may be 5 to 25 %wt. These dispersions are capable of forming a free-standing, coherent, elastomeric, solid film which, after drying and annealing at 80 °C for 30 minutes, demonstrates a tensile strength of about 11.0 MPa or greater. These dispersions are stated to be suitable for use in the manufacture of surgical gloves, condoms, catheters, balloons and other thin elastomeric articles.

One factor that is important in the manufacture of gloves, condoms and catheters is comfort. In the requirements for surgical gloves according to ASTM D3577 the stress at 500% elongation is used to indicate stiffness and flexibility. However, it can hardly predict these comfort-related properties at low percentages of elongation during the actual use of the gloves. A much better parameter to indicate flexibility and softness is measurement of stress at very low values of elongation, such as the Young's modulus, being the modulus at zero per cent elongation. Another factor is the thickness of the film which also affects the feeling of comfort during use. Evidently, the film thickness may be influenced by concentration of the rubber in the latex or the application methods, including number of times that the article is dipped and/or the duration of each dipping. Evidently, when an industrial process is being applied, it would be advantageous if thinner films could be prepared without unnecessary amendments to the process. It has now been found that if a latex of block copolymers of vinyl aromatic monomers and conjugated dienes is also subjected to vulcanisation, the tensile strength of the resulting article is further improved and thinner films may be obtained, thereby enhancing the comfort-related properties of the resulting articles.

Accordingly, the present invention provides a process for preparing articles from a latex comprising water and a styrenic block copolymer, wherein the styrenic block copolymer has 2 or more poly(vinyl aromatic) blocks and at least one block of polymerized conjugated

diene, wherein the styrenic block copolymer has a weight average molecular weight of 150,000 to 250,000, the poly(vinyl aromatic) blocks have a weight average molecular weight ranging from 9,000 to 15,000, and the content of poly(vinylaromatic) blocks in the styrenic block copolymer ranges from 8 to 15 %wt, based on the total styrenic block copolymer, which process comprises coating a surface with the latex to obtain a film, wherein the latex comprises a vulcanising agent.

Vulcanization of rubber is well known in the art. The vulcanization according to the present invention is typically carried out using common compounding ingredients. Typically sulphur compounds are being used to create cross-linking between the unsaturated bonds in the rubber chains. As is known from, e.g., WO 2007/017368 it is also possible to use one or more other additives, generally known as accelerators. Therefore, it is preferred to use in the present process a sulphur compound and optionally one or more accelerators. The sulphur compound may be any suitable sulphur-donating compound and is suitably selected from the group consisting of sulphur, thiuram sulphides, such as tetramethylthiuram disulfide, tetraethylthiuram disulfide, tetrabutylthiuram disulfide, tetrabenzylthiuram disulfide, dipentamethylene thiuram hexasulfide, dipentamethylene thiuram tetrasulfide, dithiodimorpholine, caprolactam disulfide, dialkylthiophosphoryl disulfide and mixtures thereof. For convenience's reasons sulphur is advantageously used.

It is very suitable to include accelerators in the vulcanisation process for the purpose of reducing the vulcanizing time or increasing the vulcanization rate. The accelerators used in the vulcanization step are conventional accelerators that are typically used for the preparation of gloves and condoms and the like from isoprene rubber latex. These curing agents already meet the stringent requirements for use in surgical gloves, food contact and use in condoms and the like. These accelerators are suitably selected from the group consisting of a sulphenamide compounds, thiazole compounds, thiuram compounds, dithiocarbamates, xanthates and guanidines. Examples of these compounds include N-cyclohexyl-2-benzothiazyl sulfenamide, condensation product of n-butylaldehyde and aniline, zinc-2-mercaptobenzothiazole, diisopropylxanthogen polysulphide, zinc diethyldithiocarbamate and zinc di-isononyldithiocarbamate. A further suitable accelerator is diphenylguanidine, as disclosed in WO 2007/017368.

Other additives may also be added to the reaction mixture. Such additives include antioxidants, such as hindered phenolic compounds, e.g., the butylated reaction product of p-cresol and dicyclopentadiene (available as Wingstay L), butylated phenol and octylated phenol, fillers, activators, such as alkaline earth metal oxides or zinc oxide, dispersion

stabilisers, such as alkali metal or alkaline earth metal caseinate, sodium lauryl sulphate and sorbitan fatty acid esters and a surfactant or combination of surfactants.

The amount of the sulphur compound may vary. Typically the amount by weight of sulphur compound will be from 0.2 to 4 parts by weight per hundred parts by weight of the combination of water and styrenic block copolymer ("phr"). The amounts by weight of the accelerator may suitably vary from 0.1 to 1.0 part per hundred parts of the water and styrenic block copolymer combination. Surprisingly, the process of the present invention can efficiently be carried out with a relatively low amount of sulphur compound. Therefore, the amount of sulphur in the vulcanization ranges advantageously from 0.2 to 1 phr. It will be evident that the low amount is advantageous since the lower the amount is, the less likelihood for a significant allergic reactions is.

The vulcanization may generally be carried out by subjecting a latex that comprises the sulphur compound, to heating. This will make the sulphur react with the unsaturation in the polymer chains of the styrenic block copolymer, thereby creating crosslinkings. It is also convenient to have the composition comprising the latex and the sulphur compound and optionally other additives on a heated surface to accomplish the vulcanising reaction.

Styrenic block copolymers are known and commercially available, for instance from Kraton Polymers LLC and other companies. In the current invention, a single styrenic block copolymer may be used, or a combination of styrenic block copolymers. In the process of the present invention, the styrenic block copolymer is preferably of the general formula A-B-A, wherein each block A independently is a poly(vinyl aromatic) block, and wherein block B is a block of polymerized conjugated diene, wherein each block independently may be a homopolymer block or a copolymer block, and wherein block B may be partly hydrogenated. Suitably, the block B is not hydrogenated; it suitably contains at least 90% of its original unsaturation.

Preferably each poly(vinyl aromatic) block independently is a block composed mainly of polymerized vinyl aromatic monomer. The poly(vinyl aromatic) block may contain a copolymerizable monomer, but preferably in an amount of less than 5% by weight based on the weight of the poly(vinyl aromatic) block. The poly(vinyl aromatic) block may for instance comprise less than 5 wt% of a conjugated diene such as butadiene or isoprene. The vinyl aromatic monomer is preferably styrene. Hence, each poly(vinyl aromatic) block independently is preferably a polystyrene block, containing less than 5 wt% of copolymerizable monomer, based on the weight of poly(vinyl aromatic)block.

Preferably each block conjugated diene is a block composed mainly of polymerized conjugated diene. It may contain remnants of a coupling agent. The block conjugated diene may be partially hydrogenated, for instance up to 80% of the original unsaturation. The block may contain a mixture of conjugated dienes that are copolymerized. In addition, the block may contain a copolymerizable monomer, but preferably in an amount of less than 5% by weight based on the weight of the block. The block conjugated diene may for instance comprise up to 5 wt% of a vinyl aromatic monomer such as styrene. Preferably, the conjugated diene used for the preparation of block conjugated diene is butadiene or isoprene or a mixture of butadiene and isoprene, more preferably isoprene. Hence, each block of polymerized conjugated diene is preferably a polyisoprene block, containing less than 5 wt% of copolymerizable monomer, based on the weight of block polymerized conjugated diene.

The styrenic block copolymer may be prepared in any way known in the art. One possible method for the reparation includes the production of a poly (vinyl aromatic) block A and add thereto a block of polymerised conjugated diene B. The resulting diblock A-B may subsequently be coupled to a triblock by using a bifunctional coupling agent, or to a star-shaped block copolymer by using a multi-functional coupling agent such as a core of poly (divinylbenzene) or a silicon compound, such as $SiCl_4$. Another preparation method includes sequential polymerisation by polymerising a block A first, polymerising subsequently a block B to the block A obtained, then again a block A, and so forth.

In the process of the present invention, the preferred styrenic block copolymer has the general formula A-B-A wherein each A represents a polystyrene block and B represents an polyisoprene block. More preferably the styrenic block copolymer is a sequential SIS block copolymer, wherein S represents a polystyrene block and I a polyisoprene block. A sequential block copolymer is made by sequentially preparing a block copolymer comprising blocks A, B and then A, and therefore differs from a coupled block copolymer that is made by sequentially preparing a diblock copolymer comprising blocks A, ½ B and then coupling the diblock copolymer.

The styrenic block copolymer has a poly(vinyl aromatic) content of from 8 to 15 wt%, preferably 9 to 14 wt%, based on the weight of the styrenic clock copolymer. Moreover, the styrenic block copolymer has a weight average molecular weight (determined by GPC) of from 150,000 to 250,000, preferably from 170,000 to 220,000. Each poly(vinyl aromatic) block of the styrenic block copolymer has a weight average molecular weight of from 8,000 to 15,000, preferably from 9,000 to 14,000.

The styrenic block copolymer may be prepared by processes known in the art, using an organolithium compound as initiator with sequential polymerization of the monomers styrene, isoprene and styrene, respectively, in a solvent. A-B-A block copolymers are for instance described in US3265765. Sequential polymerization is for instance described in Chapter 3 of Thermoplastic Elastomers, A comprehensive review, edited by N.R. Legge, G. Holden and H.E. Schroeder (ISBN 3-446-14827-2 Carl Hanser Verlag, Munich, Vienna, New York 1987).

Suitably, the styrenic block copolymer that is used in the process according to the present invention has been prepared by sequential polymerization of
(i) a vinyl aromatic monomer or a mixture (a) composed for at least 95 wt% of a vinyl aromatic monomer and at most 5 wt% of a copolymerizable monomer, based on the weight of the mixture (ia
(ii) a conjugated diene or a mixture (b) composed for at least 95 wt% of a conjugated diene, and at most 5 wt% of a copolymerizable monomer based on the mixture (b), and
(iii) a vinyl aromatic monomer or a mixture (c) composed for at least 95 wt% of a vinyl aromatic monomer and at most 5 wt% of a copolymerizable monomer based on the mixture (c).

For the preparation of the synthetic latex anionic, cationic or non-ionic surfactants or combinations thereof may be used. The surfactant is present in a sufficient amount to emulsify the styrenic block copolymer (or copolymers if a combination of block copolymers is used). To produce a synthetic latex, the styrenic block copolymer, usually in the form of a solution in an organic solvent (also referred to as a cement), is dispersed in water using a suitable surfactant or a combination of surfactants and the organic solvent is removed. A suitable procedure is disclosed in, e.g., US 3238173.

For the preparation of thin walled rubber articles preferably a synthetic latex is used having a solids content of from 20 to 80%, more preferably of from 30 to 70% by weight. Most preferably the synthetic latex has a solids content of from 35 to 65% by weight.

To prepare a thin walled rubber article from the latex, such as a film, a suitable surface is coated with the latex and the water thereafter removed by evaporation. A second or further layer may be provided in the same manner to achieve thicker films. The film resulting from the foregoing procedure is dried and vulcanised, if desired, by any suitable technique. Heating is typically used, with preferred temperatures for drying and vulcanisation varying from 25 to 130 °C.

To prepare a dipped article, a similar process is used, wherein a mould is dipped into the latex. In a preferred embodiment of the process for making a thin walled article, the mould is dipped into the latex. The dip-coated mould is then removed from the latex and dried. The mould may be dip coated more than once in the same latex. In an alternative process a mould is dip-coated in a first latex, followed by (air) drying and dip-coating in a second latex and so forth. In this way balloons, and condoms may be made. In a different embodiment, the mould may be dipped in a dispersion of a coagulant, the coagulant on the surface of the mould may be dried, and subsequently, the mould is dipped into the rubber latex. The latter manner is especially used for the manufacture of gloves.

In addition to the vulcanising agent and optional other additives that have been described above, the latex may comprise various other additives such as oils, co-solvents, waxes, colorants, tackifiers, fillers, release agents, anti-blocking agents and other conventional additives.

The present invention also provides a latex comprising water, a styrenic block copolymer, wherein the styrenic block copolymer has 2 or more poly(vinyl aromatic) blocks and at least one block of polymerized conjugated diene, wherein the styrenic block copolymer has a weight average molecular weight of 150,000 to 250,000, the poly(vinyl aromatic) blocks have a weight average molecular weight ranging from 9,000 to 15,000, and the content of poly(vinylaromatic) blocks in the styrenic block copolymer ranges from 8 to 15 %wt, based on the total styrenic block copolymer, and a vulcanising agent.

As indicated above, the vulcanising agent preferably comprises a sulphur compound and optionally, accelerators. The sulphur compounds may suitably be selected from the compounds mentioned above. The same holds for the accelerators and the amount of the components in the latex.

A further aspect of the present invention is directed to a styrenic block copolymer comprising 2 or more poly(vinyl aromatic) blocks and at least one block of polymerized conjugated diene, wherein the styrenic block copolymer has a weight average molecular weight of 150,000 to 250,000, the poly(vinyl aromatic) blocks have a weight average molecular weight ranging from 9,000 to 15,000, and the content of poly(vinylaromatic) blocks in the styrenic block copolymer ranges from 8 to 15 %wt, based on the total styrenic block copolymer.

The present invention also specifically provides for the article that has been obtained by the process for preparing an article from the latex as described above, and to the use of any such article as glove, catheter or condom.

Additional features and advantages of the present invention are described in the following examples.

Test methods:

Molecular weights were determined by GPC (Gel Permeation Chromatography) using a calibration curve based on mono-dispersed polystyrene standards such as is done according to ASTM 3536. The molecular weight of polymers measured using GPC so calibrated are styrene equivalent molecular weights. The styrene equivalent molecular weight may be converted to true molecular weight when the styrene content of the polymer and the vinyl content of the diene segments are known. The detector used is preferably a combination ultraviolet and refractive index detector.

Tests for physical properties were performed using ASTM D412 (92), die C. All tests were performed on an Instron 4465 tensile machine. Since the Young's modulus (at 0% elongation) of the very soft and flexible materials that were obtained in the experiments appeared very difficult to measure, the modulus of the synthetic latices at low elongation (between 5 and 15 %) was measured and the result was called "10% Young's modulus". The values in Example 1 represent average values measured on films during 7 days.

Example 1

A series of latices were formed from isoprene rubber, polystyrene-polyisoprene rubber and polystyrene-polyisoprene-polystyrene block copolymers. Test specimens were prepared by first dipping stainless steel plates in a coagulant solution and, after drying, in the polymer latex. The objective was to form a uniform layer of the latex as it precipitated onto the plates. The forms with the adhered latex were then air-dried at room temperature to evaporate the water from the thin elastomeric layer to yield a dry film. The films were then vulcanised in an oven at 110-130 °C for 15 minutes.

In the experiments two different vulcanisation packages were used, the compositions of which are described in the Table 2 below.

Table 2. Vulcanisation packages; amounts in part per 100 parts of water and rubber

Compound	Package A	Package B

Sulphur	0.63	1.25
Sodium caseinate	0.75	0.75
Zinc diethyldithiocarbamate	0.5	0.5
Diphenyl guanidine	0.5	1.0
Wingstay L	2.0	2.0

(a) A comparative test sample was prepared with Cariflex® IR 401 polyisoprene latex. This IR 401 is an isoprene rubber with a weight average molecular weight of 2,500,000 with a high cis content. This is the preferred polysioprene rubber in WO 2007/07368. With this synthetic latex comprising vulcanisation package B, it was possible to achieve a tensile strength of 21.3 MPa, a tear strength of 35.4 N/mm and a “10% Young’s modulus” of 0.18 MPa.

(b) The experiment of Example 1(a) was repeated with the sole difference that vulcanisation package A was included in the latex. A tensile strength of 17.6 MPa and a “10% Young’s modulus” of 0.17 MPa were obtained.

(c) The experiment of Example 1(a) was repeated with the difference that a polyisoprene rubber with a weight average molecular weight of 500,000 was used, the tensile strength drastically reduced to 15.4 MPa, and a “10% Young’s modulus” of 0.14 MPa was obtained.

(d) A minor improvement is seen when a block copolymer comprising a polyisoprene block and a single styrene block (polystyrene content of 2.5%) is used. When (c) was repeated with a high cis, two block rubber with a molecular weight of 470,000 of the polysioprene block and a molecular weight of 12,000 of the polystyrene block, a tensile strength was found of 17.4 MPa, and a “10% Young’s modulus” of 0.17 MPa.

(e) A comparative test sample was prepared with Kraton® D1160. D1160 is an SIS type block copolymer with a molecular weight of the polyisoprene block of 117,000 and a molecular weight of each of the polystyrene blocks of 11,000. The polystyrene content is 19 wt%. Vulcanization package B was applied. With this synthetic latex it was possible to achieve a tensile strength of 22.6 MPa, but with a “10%Young’s modulus” that is twice as high as that of IR 401, of 0.37 MPa.

(f) Experiment of Example 1(e) was repeated with the difference that vulcanisation package A was included in the latex. A tensile strength of 26.0 MPa and a “10% Young’s modulus” of 0.38 MPa were obtained.

(g) The experiment of Example 1(e) was repeated but without the addition of a vulcanisation package. A tensile strength of 22.2 MPa and a “10% Young’s modulus” of 0.33 MPa were obtained.

(h) The experiment of Example I(e) was repeated, with an SIS type block copolymer with a weight average molecular weight of the styrenic block copolymer of 182,000 and a molecular weight of each of the polystyrene blocks of 12,000. The polystyrene content is 14 wt%. Vulcanization package A was used. With this synthetic latex it was possible to achieve a tensile strength of 27.2 MPa and a ”10% Young’s modulus” of only 0.25 MPa.

(i) The experiment of Example I(h) was repeated, but without the addition of a vulcanisation package. A tensile strength of 22.3 MPa and a “10% Young’s modulus” of 0.24 MPa were obtained.

(j) The experiment of Example I(h) was repeated, with an SIS type block copolymer with a weight average molecular weight of the styrenic block copolymer of 193,000 and a molecular weight of each of the polystyrene blocks of 11,000. The polystyrene content is 12 wt%. Vulcanization package A was used. With this synthetic latex it was possible to achieve a tensile strength of 33.9 MPa and a ”10% Young’s modulus” of only 0.25 MPa.

(k) The experiment of Example I(j) was repeated, but without the addition of a vulcanisation package. A tensile strength of 21.0 MPa and a “10% Young’s modulus” of 0.25 MPa were obtained.

(l) The experiment of Example I(h) was repeated, with an SIS type block copolymer with a weight average molecular weight of the styrenic block copolymer of 206,000 and a molecular weight of each of the polystyrene blocks of 11,000. The polystyrene content is 11 wt%. Vulcanization package A was used. With this synthetic latex it was possible to achieve a tensile strength of 29.4 MPa and a ”10% Young’s modulus” of only 0.22 MPa.

(m) The experiment of Example I(l) was repeated, but without the addition of a vulcanisation package. A tensile strength of 22.0 MPa and a “10% Young’s modulus” of 0.21 MPa were obtained.

(n) The experiment of Example I(h) was repeated, with an SIS type block copolymer with a weight average molecular weight of the styrenic block copolymer of 210,000 and a molecular weight of each of the polystyrene blocks of 10,000. The polystyrene content is 10 wt%. Vulcanization package A was used. With this synthetic latex it was possible to achieve a tensile strength of 23.9 MPa and a ”10% Young’s modulus” of only 0.24 MPa.

(o) The experiment of Example I(l) was repeated, but without the addition of a vulcanisation package. A tensile strength of 21.0 MPa and a “10% Young’s modulus” of 0.22 MPa were obtained.

The results are summarised in the following Table 3.

Table 3: Results of the experiments (I= polyisoprene; S =polystyrene; Mw S = mol weight of styrene blocks, PSC = polystyrene content; T.S. = tensile strength, 10%Ym = “10% Young’s modulus”)

Exp.	Polymer	Mw	Mw S	PSC, %wt	Vulcanisation package	T.S., MPa	10%Ym, MPa
(a)	I	2,500,000	-	-	B	21.3	0.18
(b)	I	2,500,000	-	-	A	17.6	0.17
(c)	I	500,000	-	-	B	15.4	0.14
(d)	SI	482,000	12,000	2.5	B	17.4	0.17
(e)	SIS	117,000	11,000	19	A	22.6	0.37
(f)	SIS	117,000	11,000	19	B	26.0	0.38
(g)	SIS	117,000	11,000	19	-	22.2	0.33
(h)	SIS	182,000	12,000	14	A	27.2	0.25
(i)	SIS	182,000	12,000	14	-	22.3	0.24
(j)	SIS	193,000	11,000	12	B	33.9	0.25
(k)	SIS	193,000	11,000	12	-	21.0	0.25
(l)	SIS	206,000	11,000	11	A	29.4	0.22
(m)	SIS	206,000	11,000	11	-	22.0	0.21
(n)	SIS	210,000	10,000	10	A	23.9	0.24
(o)	SIS	210,000	10,000	10	-	21.0	0.22

Experiments (h), (j), (l) and (n) are experiments according to the invention. The results clearly show that when a styrenic block copolymer is used and the molecular weight, the styrene content and the styrene molecular weight are within the ranges of the present invention and when a vulcanising agent is added to the latex, articles with a high tensile

strength are obtained whilst their stress at small elongation is low and not affected by the vulcanisation. Moreover, the tensile strength is significantly higher compared to articles prepared without vulcanisation.

Example 2

To show the effect of vulcanization on the film thickness the latices of experiments 1(h) and 1(i), and 1(n) and 1(o) were tested using identical dipping conditions. The latex into which the stainless steel plates were dipped, contained 40%wt of styrenic block copolymer. The plates were dipped once during 30 seconds. The film thickness was measured immediately after vulcanisation. When the latex did not contain a vulcanising agent the film thickness was measured after curing. Vulcanisation was conducted as in Example 1.

The results are shown in the following Table 4.

Table 4. Film thickness

Copolymer of experiment	Film thickness, mm
1(h)	0.183
1(i)	0.248
1(n)	0.196
1(o)	0.261

These results clearly show that vulcanisation also results in thinner films at comparable conditions.

C L A U S E S

1. A process for preparing articles from a latex comprising water and a styrenic block copolymer, wherein the styrenic block copolymer has 2 or more poly(vinyl aromatic) blocks and at least one block of polymerized conjugated diene, wherein the styrenic block copolymer has a weight average molecular weight of 150,000 to 250,000, the poly(vinyl aromatic) blocks have a weight average molecular weight ranging from 9,000 to 15,000, and the content of poly(vinylaromatic) blocks in the styrenic block copolymer ranges from 8 to 15 %wt, based on the total styrenic block copolymer, which process comprises coating a surface with the latex to obtain a film, wherein the latex comprises a vulcanising agent.
2. The process according to clause 1, wherein the vulcanising agent comprises a sulphur compound and, optionally, one or more accelerators.
3. The process according to clause 2, wherein one or more accelerators are used and are selected from the group consisting of sulphenamide compounds, thiazole compounds, thiuram compounds, dithiocarbamates, xanthates and guanidines.
4. The process according to clause 2 or 3, wherein the sulphur compound has been selected from the group consisting of sulphur, thiuram sulphides, dithiodimorpholine, caprolactam disulphide, dialkylthiophosphoryl disulphide diisopropylxanthogen polysulphide, and mixtures thereof.
5. The process according to any one of clauses 2 to 4, wherein the amount of the sulphur compound ranges from 0.2 to 4 parts by weight per hundred parts by weight of the combination of water and styrenic block copolymer.
6. The process according to any one of clauses 1 to 5, wherein the styrenic block copolymer is of the general formula A-B-A, wherein each block A independently is a poly(vinyl aromatic) block, and wherein block B is a block of polymerized conjugated diene, wherein each block independently is a homopolymer block or a copolymer block, and optionally a block B is partly hydrogenated.
7. The process according to any one of clauses 1 to 6, wherein each poly(vinyl aromatic) block independently is a polystyrene block, containing less than 5 wt% of copolymerizable monomer, based on the weight of poly(vinyl aromatic)block.
8. The process according to any one of clauses 1 to 7, wherein each block of polymerized conjugated diene is a polyisoprene block, containing less than 5 wt% of copolymerizable monomer, based on the weight of block polymerized conjugated diene.
9. The process according to clause 6, wherein the styrenic block copolymer has the general formula A-B-A, wherein each A represents a polystyrene block and B represents a polyisoprene block.

10. The process according to any one of clauses 1 to 9, wherein the styrenic block copolymer has a poly(vinyl aromatic) content of from 9 to 14 wt%, based on the weight of the styrenic block copolymer.

11. The process according to any one of clauses 1 to 10, wherein the styrenic block copolymer has a weight average molecular weight of from 170,000 to 220,000.

12. The process according to any one of clauses 1 to 11, wherein each poly(vinyl aromatic) block of the styrenic block copolymer has a weight average molecular weight of from 9,000 to 14,000.

13. The process according to any one of clauses 1 to 12, wherein the styrenic block copolymer has been prepared by sequential polymerization of
(i) a vinyl aromatic monomer or a mixture (a) composed for at least 95 wt% of a vinyl aromatic monomer and at most 5 wt% of a copolymerizable monomer, based on the weight of the mixture (a)
(ii) a conjugated diene or a mixture (b) composed for at least 95 wt% of a conjugated diene, and at most 5 wt% of a copolymerizable monomer based on the weight of the mixture (b), and
(iii) a vinyl aromatic monomer or a mixture (c) composed for at least 95 wt% of a vinyl aromatic monomer and at most 5 wt% of a copolymerizable monomer based on the weight of the mixture (c).

14. A latex comprising water, a styrenic block copolymer, wherein the styrenic block copolymer has 2 or more poly(vinyl aromatic) blocks and at least one block of polymerized conjugated diene, wherein the styrenic block copolymer has a weight average molecular weight of 150,000 to 250,000, the poly(vinyl aromatic) blocks have a weight average molecular weight ranging from 9,000 to 15,000, and the content of poly(vinylaromatic) blocks in the styrenic block copolymer ranges from 8 to 15 %wt, based on the total styrenic block copolymer, and a vulcanising agent.

15. The latex according to clause 14, wherein the vulcanising agent comprises a sulphur compound and, optionally, one or more accelerators.

16. The latex according to clause 15, wherein the sulphur compound has been selected from the group consisting of sulphur, thiuram sulphides, dithiodimorpholine, caprolactam disulphide, dialkylthiophosphoryl disulphide diisopropylxanthogen polysulphide, and mixtures thereof.

17. The latex according to claim 15 or 16, wherein the latex comprises one or more accelerators, selected from the group consisting of sulphenamide compounds, thiazole compounds, thiuram compounds, dithiocarbamates, xanthates and guanidines.

18. The latex according to any one of clauses 15 to 17, wherein the amount of the sulphur compound ranges from 0.2 to 4 parts by weight per hundred parts by weight of the combination of water and styrenic block copolymer.

19. The latex according to any one of clauses 15 to 18, wherein the latex comprises from 20 to 80%, preferably from 30 to 70% by weight of styrenic block copolymer, based on the weight of the combination of water and styrenic block copolymer.

20. Styrenic block copolymer comprising has 2 or more poly(vinyl aromatic) blocks and at least one block of polymerized conjugated diene, wherein the styrenic block copolymer has a weight average molecular weight of 150,000 to 250,000, the poly(vinyl aromatic) blocks have a weight average molecular weight ranging from 9,000 to 15,000, and the content of poly(vinylaromatic) blocks in the styrenic block copolymer ranges from 8 to 15 %wt, based on the total styrenic block copolymer.

21. An article prepared according to the process of any one of clauses 1 to 19.

22. Use of the article according to claim 21 as glove, catheter or condom.

C O N C L U S I E S

1. Werkwijze voor het bereiden van artikelen uit een latex die water en een styrenisch blokcopolymeer omvat, waarbij het styrenisch blokcopolymeer 2 of meer poly(vinylaromatische) blokken en ten minste één blok van gepolymeriseerd geconjugeerd dieen heeft, waarbij het styrenisch blokcopolymeer een gewichtsgemiddelde moleculegewicht van 150.000 tot 250.000 heeft, de poly(vinylaromatische) blokken een gewichtsgemiddelde moleculegewicht in het gebied van 9.000 tot 15.000 hebben, en het gehalte van poly(vinylaromatische) blokken in het styrenisch blokcopolymeer in het gebied van 8 tot 15 gew.% ligt, gebaseerd op het complete styrenisch blokcopolymeer, welke werkwijze het bekleden van een oppervlak met een latex omvat om een film te krijgen, waarbij de latex een vulkaniserend middel omvat.

2. Werkwijze volgens conclusie 1, waarbij het vulkaniserende middel een zwavelverbinding en, eventueel, één of meer versnellers omvat.

3. Werkwijze volgens conclusie 2, waarbij één of meer versnellers worden gebruikt en zijn gekozen uit de groep bestaande uit sulfenamide verbindingen, thiazool verbindingen, thiuram verbindingen, dithiocarbamaten, xanthaten en guanidines.

4. Werkwijze volgens conclusie 2 of 3, waarbij de zwavelverbinding is gekozen uit de groep bestaande uit zwavel, thiuram sulfides, dithiodimorfoline, caprolactam disulfide, dialkylthiophosphoryl disulfide, diisopropylxanthogeen polysulfide, en mengsels daarvan.

5. Werkwijze volgens een van de conclusies 2 tot 4, waarbij de hoeveelheid zwavelverbinding in het gebied van 0,2 tot 4 gewichtsdelen per honderd gewichtsdelen van de combinatie van water en styrenisch blokcopolymeer ligt.

6. Werkwijze volgens een van de conclusies 1 tot 5, waarbij het styrenisch blokcopolymeer de algemene formule A-B-A heeft, waarbij elk blok A onafhankelijk een poly(vinylaromatisch) blok is, en waarbij B een blok van gepolymeriseerd geconjugeerde dieen is, waarbij elk blok onafhankelijk een homopolymeerblok of een copolymeerblok is, en eventueel een blok B gedeeltelijk is gehydrogeneerd.

7. Werkwijze volgens een van de conclusies 1 tot 6, waarbij elk poly(vinylaromatisch) blok onafhankelijk een polystyreenblok is met minder dan 5 gew.% van copolymeriseerbare monomeer, gebaseerd op het gewicht van poy(vinylaromatisch) blok.

8. Werkwijze volgens een van de conclusies 1 tot 7, waarbij elk blok van gepolymeriseerd geconjugeerd dieen een polyisopreenblok is met minder dan 5 gew.% van copolymeriseerbaar monomeer, gebaseerd op het gewicht van het blok gepolymeriseerd geconjugeerd dieen.

9. Werkwijze volgens conclusie 6, waarbij het styrenisch blokcopolymeer de algemene formule A-B-A heeft, waarbij elke A een polystyreenblok voorstelt en B een polyisopreenblok voorstelt.

10. Werkwijze volgens een van de conclusies 1 tot 9, waarbij het styrenisch blokcopolymeer een poly(vinylaromatisch) gehalte heeft van 9 tot 14 gew.%, gebaseerd op het gewicht van het styrenisch blokcopolymeer.

11. Werkwijze volgens een van de conclusies 1 tot 10, waarbij het styrenisch blokcopolymeer een gewichtsgemiddelde moleculegewicht van 170.000 tot 220.000 heeft.

12. Werkwijze volgens een van de conclusies 1 tot 11, waarbij elk poly(vinylaromatisch) blok van het styrenisch blokcopolymeer een gewichtsgemiddelde moleculegewicht van 9.000 tot 14.000 heeft.

13. Werkwijze volgens een van de conclusies 1 tot 12, waarbij het styrenisch blokcopolymeer is bereid met opeenvolgende polymerisatie van

(i) een vinylaromatisch monomeer of een mengsel (a) dat voor ten minste 95 gew.% bestaat uit een vinylaromatisch monomeer en voor ten hoogste 5 gew.% uit een copolymeriseerbaar monomeer, gebaseerd op het gewicht van mengsel (a);

(ii) een geconjugeerd dieen of een mengsel (b) dat voor ten minste 95 gew.% bestaat uit een geconjugeerd dieen en voor ten hoogste 5 gew.% uit een copolymeriseerbaar monomeer, gebaseerd op het gewicht van mengsel (b); en

(iii) een vinylaromatisch monomeer of een mengsel (c) dat voor ten minste 95 gew.% bestaat uit een vinylaromatisch monomeer en voor ten hoogste 5 gew.% uit een copolymeriseerbaar monomeer, gebaseerd op het gewicht van mengsel (c).

14. Latex, omvattende water, een styrenisch blokcopolymeer waarbij het styrenisch blokcopolymeer 2 of meer poly(vinylaromatische) blokken en ten minste één blok van gepolymeriseerd geconjugeerd dieen heeft, waarbij het styrenisch blokcopolymeer een gewichtsgemiddelde moleculegewicht van 150.000 tot 250.000 heeft, de poly(vinylaromatische) blokken een gewichtsgemiddelde moleculegewicht in het gebied van

9.000 tot 15.000 hebben, en het gehalte van poly(vinylaromatische) blokken in het styrenisch blokcopolymeer in het gebied van 8 tot 15 gew.% ligt, gebaseerd op het complete styrenisch blokcopolymeer, en een vulkaniserend middel.

15. Latex volgens conclusie 14, waarbij het vulkaniserende middel is gekozen uit een zwavelverbinding en eventueel één of meer versnellers.

16. Latex volgens conclusie 15, waarbij de zwavelverbinding is gekozen uit de groep bestaande uit zwavel, thiuram sulfides, dithiodimorfoline, caprolactam disulfide, dialkylthiophosphoryl disulfide, diisopropylxanthogeen polysulfide, en mengsels daarvan.

17. Latex volgens conclusie 15 of 16, waarbij de latex één of meer versnellers bevat die zijn gekozen uit de groep bestaande uit sulfenamide verbindingen, thiazool verbindingen, thiuram verbindingen, dithiocarbamaten, xanthaten en guanidines.

18. Latex volgens een van de conclusies 15 tot 17, waarbij de hoeveelheid zwavelverbinding in het gebied van 0,2 tot 4 gewichtsdelen per honderd gewichtsdelen van de combinatie van water en styrenisch blokcopolymeer ligt.

19. Latex volgens een van de conclusies 15 tot 18, waarbij de latex 20 tot 80 %, bij voorkeur van 30 tot 70% aan styrenisch blokcopolymeer bevat, gebaseerd op het gewicht van de combinatie van water en styrenisch blokcopolymeer.

20. Styrenisch blokcopolymeer dat 2 of meer poly(vinylaromatische) blokken en ten minste één blok van gepolymeriseerd geconjugeerd dieen heeft, waarbij het styrenisch blokcopolymeer een gewichtsgemiddelde moleculegewicht van 150.000 tot 250.000 heeft, de poly(vinylaromatische) blokken een gewichtsgemiddelde moleculegewicht in het gebied van 9.000 tot 15.000 hebben, en het gehalte van poly(vinylaromatische) blokken in het styrenisch blokcopolymeer in het gebied van 8 tot 15 gew.% ligt, gebaseerd op het complete styrenisch blokcopolymeer.

21. Artikel dat bereid is volgens de werkwijze volgens een van de conclusies 1 tot 19.

22. Toepassing van het artikel volgens conclusie 21 als handschoen, katheder of condoom.

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE
	P30733NL00/AZE
Nederlands aanvraag nr. **2007262**	Indieningsdatum **12-08-2011**
	Ingeroepen voorrangsdatum
Aanvrager (Naam) **Kraton Polymers U.S. LLC**	
Datum van het verzoek voor een onderzoek van internationaal type **19-11-2011**	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. **SN 57204**

I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)

Volgens de internationale classificatie (IPC)

C08F297/04 **C09D153/02** **C08J3/03** **C08K3/00** **C08J5/02**

A61B19/04 **A61F6/04** **A61M25/10**

II. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimumdocumentatie

Classificatiesysteem	Classificatiesymbolen
IPC8	**C08F C09D C08J C08K A61B A61F A61M**

Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

III.	☐ **GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES**	(opmerkingen op aanvullingsblad)
IV.	☐ **GEBREK AAN EENHEID VAN UITVINDING**	(opmerkingen op aanvullingsblad)

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2007262

A. CLASSIFICATIE VAN HET ONDERWERP

INV. C08F297/04 C09D153/02 C08J3/03 C08K3/00 C08J5/02
A61B19/04 A61F6/04 A61M25/10
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte miminum documentatie (classificatie gevolgd door classificatiesymbolen)
C08F C09D C08J C08K A61B A61F A61M

Onderzochte andere documentatie dan de mimimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)
EPO-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	WO 94/15997 A1 (DOW CHEMICAL CO [US]) 21 juli 1994 (1994-07-21)	20
Y	* bladzijde 1, regel 24 - regel 30 * * bladzijde 2, regel 31 - bladzijde 3, regel 9; conclusies * * voorbeelden 2,3,6 *	1-22

Y	EP 1 731 562 A1 (ZEON CORP [JP]) 13 december 2006 (2006-12-13) * conclusies; tabellen 2-1 *	1-22

A,D	WO 2007/017368 A1 (KRATON POLYMERS RES BV [NL]; JOLE VAN EVERT [BE]) 15 februari 2007 (2007-02-15) in de aanvraag genoemd * conclusies; voorbeelden *	1-22

	-/--	

[X] Verdere documenten worden vermeld in het vervolg van vak C.

[X] Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

° Speciale categorieën van aangehaalde documenten

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvrage vermeld

"E" eerdere octrooi(aanvrage), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvrage, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"&" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid	Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type
29 februari 2012	
Naam en adres van de instantie European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	**De bevoegde ambtenaar** Iraegui Retolaza, E

2

Formulier PCT/ISA/201 (tweede blad) (Januari 2004)

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2007262

C.(Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A,D	US 5 563 204 A (SPETH DAVID R [US] ET AL) 8 oktober 1996 (1996-10-08) in de aanvraag genoemd * het gehele document * -----	1-22

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2007262

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)		Datum van publicatie
WO 9415997	A1 21-07-1994	CA	2150482 A1	21-07-1994
		DE	69404125 D1	14-08-1997
		DE	69404125 T2	22-01-1998
		EP	0678108 A1	25-10-1995
		ES	2104348 T3	01-10-1997
		JP	H08505426 A	11-06-1996
		JP	2003192869 A	09-07-2003
		WO	9415997 A1	21-07-1994
EP 1731562	A1 13-12-2006	CN	1938373 A	28-03-2007
		EP	1731562 A1	13-12-2006
		US	2007149693 A1	28-06-2007
		WO	2005095508 A1	13-10-2005
WO 2007017368	A1 15-02-2007	AT	458784 T	15-03-2010
		CA	2617281 A1	15-02-2007
		CN	101243129 A	13-08-2008
		EP	1913071 A1	23-04-2008
		ES	2338157 T3	04-05-2010
		JP	4820412 B2	24-11-2011
		JP	2009512739 A	26-03-2009
		US	2008303189 A1	11-12-2008
		WO	2007017368 A1	15-02-2007
US 5563204	A 08-10-1996	GEEN		

Agentschap NL
Ministerie van Economische Zaken, Landbouw en Innovatie

WRITTEN OPINION

File No.	Filing date *(day/month/year)*	Priority date *(day/month/year)*	Application No.
SN57204	12.08.2011		NL2007262

International Patent Classification (IPC)
INV. C08F297/04 C09D153/02 C08J3/03 C08K3/00 C08J5/02 A61B19/04 A61F6/04 A61M25/10

Applicant
Kraton Polymers U.S. LLC

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the application
- ☒ Box No. VIII Certain observations on the application

	Examiner
	Iraegui Retolaza, E

Application number

WRITTEN OPINION

NL2007262

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ on paper

   ☐ in electronic form

   c. time of filing/furnishing:

   ☐ contained in the application as filed.

   ☐ filed together with the application in electronic form.

   ☐ furnished subsequently for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes:	Claims	1-19, 21, 22
	No:	Claims	20
Inventive step	Yes:	Claims	
	No:	Claims	1-22
Industrial applicability	Yes:	Claims	1-22
	No:	Claims	

2. Citations and explanations

see separate sheet

Application number

WRITTEN OPINION

NL2007262

Box No. VIII Certain observations on the application

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

D1 WO 94/15997 A1 (DOW CHEMICAL CO [US]) 21 juli 1994 (1994-07-21)

D2 EP 1 731 562 A1 (ZEON CORP [JP]) 13 december 2006 (2006-12-13)

1. Document D1, representing the closest prior art in the present case, discloses high-strength films of block copolymer latices, as well as aqueous dispersions comprising one or more block copolymers A-B-Xm-(B-A)n, wherein each A is a polymer block consisting essentially of a monovinylidene aromatic monomer and each B is a polymer block consisting essentially of a conjugated diene. Each monovinylidene aromatic monomer block has a weight average molecular weight from 8,000 to 15,000 Daltons, each conjugated diene block has a weight average molecular weight from 50,000 to 300,000 Daltons. The A block is from 5 to 25 weight percent of the hydrocarbon phase (see the passages cited in the search report).

The subject-matter of claim 1 differs from the disclosure of D1 in that the latex comprises a vulcanising agent.

However, D2 discloses dip-forming compositions comprising a latex and a vulcanizing agent, a vulcanization accelerator and zinc oxide (see the passages cited in the search report).

In the opinion of the search authority, the man skilled in the art willing to provide a process for preparing articles having a high strength from a latex comprising water and a styrenic block copolymer (see paragraph linking pages 2 and 3 of the description) would combine the disclosure of D1 with the teaching of D2 in an obvious manner, and thus arrive at the subject-matter of claim 1 without the exercise of an inventive step.

The subject-matter of claims 14, 21 and 22 is also obvious in view of the disclosure of D1 and D2.

None of the dependent claims appears to contribute to the patentability of the application.

2. The subject-matter of claim 20 lacks novelty over the disclosure of D1.

Re Item VIII

Certain observations on the application

Claim 21 refers back to process claims 1 to 19. However, claims 14 to 19 are product claims.

The category of claim 22 is unclear.