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Figure 1

07 08 20

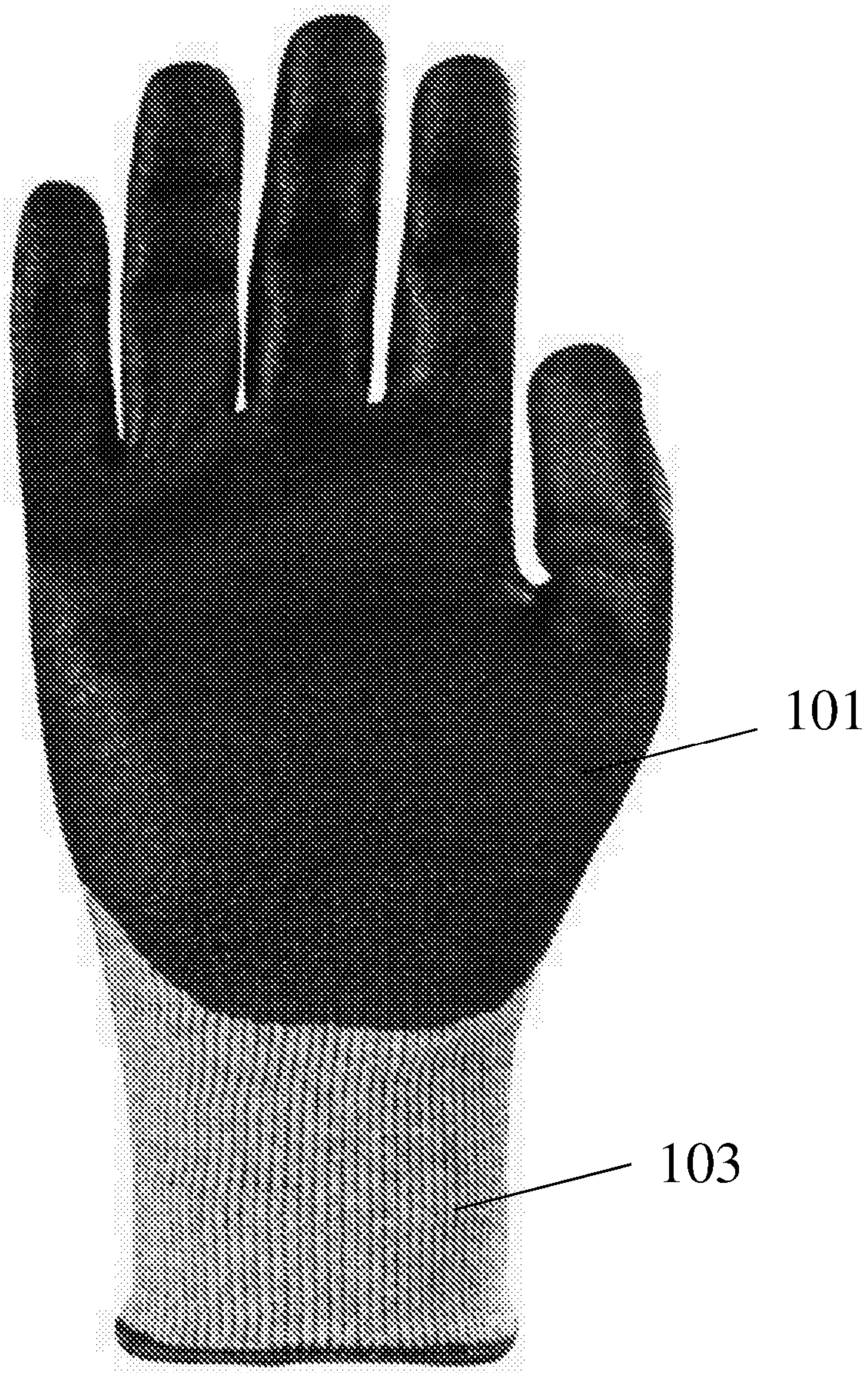

Figure 2

07 08 20

Figure 3

07 08 20

Figure 4

07 08 20

Figure 5

Glove and treatment method

The present invention relates to a glove and a treatment method for producing a treated glove.

A type of glove which is presently available comprises a fabric layer which has been contacted with a liquid polymer coating. Such gloves are sold by Traffi Safe Ltd, of Maxx House, Western Road, Bracknell, Berkshire, RG12 1QP, United Kingdom. They are sold under the Traffiglove mark. An example of such a glove is shown in figures 1 and 2. To manufacture the glove the fabric layer (101) is typically dipped in a bath of the liquid polymer coating. The glove is then removed from the bath and the polymer coating solidifies. The polymer coating (102) provides a protective outer coating over portions of the external surface of the fabric layer. In some gloves the coating may completely cover the fabric layer. The polymer coating may cover the palm and the fingers of a glove.

In some applications it is desirable for gloves to be water and oil repellent so that the outer coating and the fabric layer remain oil, water and contaminant free. During manufacturing, fabric which is intended to form the fabric portion of the glove has been treated with hydrophobic compositions. These compositions are cured at a high temperature so that the composition adheres properly to the fabric. Fabric glove inners have been treated in this manner before dipping in a polymer solution to provide the outer coating. A disadvantage of this method is that the treated fabric layer does not bond well to the polymer coating. It bonds far less well than it would do if the fabric were not treated. Furthermore, the polymer layer remains untreated and is therefore prone to retaining water and oil and becoming contaminated with materials being used in the glove's working environment.

For this reason, water and oil repellent compositions have been incorporated into the liquid polymer bath into which the fabric inner is dipped to provide the polymer layer. This way, the composition is dispersed throughout the polymer layer. However, this process is inefficient because only a small amount of the oil or water repellent composition is exposed to the surface of the glove where it can have an effect. The composition which is located in the body of the polymer layer but which is not exposed to the surface of the glove achieves no function. As water and oil repellent compositions are speciality chemicals, a process which requires a high amount of these chemicals will inevitably produce an expensive end product. It is therefore desirable to produce a more efficient process for producing gloves having an oil or water repellent polymer layer. Furthermore, if the fabric portion is separately treated before it is dipped in the (water/oil repellent) polymer solution, the weak bond between the fabric and polymer layers will still be obtained. To be practical, gloves must demonstrate an acceptable level of wash durability. That is, the water and/or oil repellence must not decrease to an unacceptable extent when the glove is washed over a number of wash cycles. Wash durability is thought to depend upon the quality of the bonding of the water repellent composition to the fabric of the glove.

It is amongst the objects of the invention to solve these problems.

In a first aspect of the invention there is provided a treatment method according to claim 1. The first polymer mentioned in step i) is not a fluorocarbon polymer. It has been found that it is possible to cure fluorocarbon polymer to an outer layer which comprises a first polymer at temperatures between 60 ˚C and 130˚C. An advantage of gloves prepared by the method is that the water repellence on both the fabric and the outer layer has a good wash durability. The fluorocarbon polymer is able to bond well to the outer layer without requiring a curing step which would degrade or melt the first polymer of the outer layer. The outer layer may have been dip, spray, dot or transfer coated onto the fabric portion.

Preferably the curing temperature is between 60 ˚C and 130 ˚C, 60 ˚C and 125 ˚C, 60 ˚C and 120 ˚C, 60 ˚C and 115 ˚C, 60 ˚C and 110 ˚C, 60 ˚C and 105 ˚C, 60 ˚C and 100 ˚C, 60 ˚C and 95 ˚C, 60 ˚C and 90 ˚C, 60 ˚C and 85 ˚C, 60 ˚C and 80 ˚C, 60 ˚C and 75 ˚C, or 60 ˚C and 70 ˚C. The curing temperature need not be a single specific temperature. That is, it may fluctuate within the ranges stated. The highest temperature possible for a particular glove will depend on the melting or degradation temperature of the specific first polymer(s) contained in the outer layer of the glove. The first polymer may have a melting or degradation point of higher than 130 ˚C, or between 130 and 125˚C, 120 ˚C, 115 ˚C, 110 ˚C, 105 ˚C, 100 ˚C, 95 ˚C, 90 ˚C, 85 ˚C, 80 ˚C, 75 ˚C or 70 ˚C.

The treatment imparts water and oil repellence on the glove. It also imparts stain resistance and makes the gloves easier to clean and de-contaminate. The treatment provides a robust oil and water repellent glove as the fabric portion is bonded strongly to the outer layer. This is because using the method according to the invention the fabric portion is not coated with a water repellent composition before the outer layer is attached to the fabric. The fabric is therefore able to bond more effectively to the outer layer.

The curing step may be carried out in an oven or in a tumble dryer. The curing step may last for between 5 and 60 minutes. More preferably the curing step lasts for between 15 and 25 minutes.

In some embodiments the fluorocarbon polymer is a fluorocarbon polymer having one or more units having 6 carbon atoms. For clarity, such a fluorocarbon polymer comprises one or more units having 6 (and not more than 6) carbon atoms. In some embodiments the fluorocarbon polymer may be a fluoroalkyl acrylate copolymer having a 6 carbon chain length. In some embodiments the fluorocarbon polymer may comprise at least one unit which comprises a carbon chain consisting of 6 carbon atoms. In some embodiments the fluorocarbon polymer may be provided as a solution which further comprises tripropylene glycol and an emulsifier. In some embodiments the fluorocarbon polymer may be Texfin® FC6. This product is available from Texchem UK Ltd, Holmes Mill, Holmes Street, Rochdale, Lancashire, OL12 6AQ, United Kingdom. In some embodiments the fluorocarbon polymer may be selected from the group of Texfin® C6-D, Texfin® C6PR, Texfin® FC64, Texfin® USRC, Texfin® C6-FCP and Texfin® C6 AD. These products are available from Texchem UK Ltd, Holmes Mill, Holmes Street, Rochdale, Lancashire, OL12 6AQ, United Kingdom.

In some embodiments the step of curing the glove may be conducted a temperature of between 115-125 ˚C. This enables the use of the method with gloves comprising commonly used first polymers.

In step ii) the fabric portion and the outer layer maybe submerged in a bath comprising water and the liquid comprising the fluorocarbon polymer, and the method may further comprise the step of removing the glove from the bath, after step ii). This ensures that a good saturation of the liquid comprising the fluorocarbon polymer is obtained which in turn provides treated gloves having a water and oil repellence which has a good wash durability. The ratio of the mass of the water and the liquid comprising the fluorocarbon polymer in the bath, to the mass of the glove or gloves to be treated (ie. the liquor ratio), may be between 6:1 and 10:1 and is preferably 6:1.

The method may further comprise the step of removing excess fluorocarbon polymer from the glove after step ii). This provides an efficient curing process, which in turn leads to enhanced bonding between the glove and the fluorocarbon polymer.

The first polymer may comprise one or more polymers selected from the group of polyurethane, styrene butadiene rubber, nitrile butadiene rubber, latex rubber, polydimethylsiloxane rubber, and thermoplastic elastomers.

The pH of the liquid comprising the fluorocarbon polymer may be between 4.0 and 6.0 and preferably between 5.4 and 5.6. This provides a favourable environment for the fluorocarbon polymer to bond with the first polymer coating.

The mass of the fluorocarbon polymer may be between 1% and 10% of the mass of the glove or gloves to be treated and is preferably between 1 and 4% of the mass of the glove or gloves to be treated. This provides an efficient process in which a minimal amount of fluorocarbon polymer is utilized.

When present, the bath in step ii) may be agitated. This ensures that saturation of the fabric portion of the glove is achieved. This provides a more water/oil repellent glove.

When present, the step of removing excess fluorocarbon polymer from the glove may comprise a step of hydroextraction, preferably to remove at least 40% by weight of the residual liquid which comprises the fluorocarbon polymer. This provides an efficient curing process, which in turn leads to enhanced bonding between the glove and the fluorocarbon polymer.

When present, the step of removing excess fluorocarbon polymer from the glove may comprise tumble drying the glove at a temperature of between 20 and 100 ˚C. Preferably the tumble drying temperature is between 60 and 80 ˚C. This provides an efficient drying process as excess liquid is removed. The drying step may also begin to cure the fluorocarbon polymer onto the glove.

The temperature of the liquid comprising the fluorocarbon polymer may be between 30 and 100˚C, preferably between 40 and 80˚C, and preferably between 40 and 45 ˚C when the glove is contacted with said liquid. This provides a favourable thermodynamic environment for the fluorocarbon polymer to bond with the first polymer layer.

Step ii) may have a duration of between 20 and 30 minutes. This duration provides time for the fabric portions and outer layer of the glove to become well saturated with the liquid comprising the fluorocarbon polymer. This produces a glove with durable water repellent characteristics.

The fabric portion may comprise one or more of; nylon, polyester, cotton, a polyester and cotton blend, a polyester and nylon blend, ultra high molecular weight polyethylene (UHMWPE) combined with elastane and nylon, UHMWPE combined with elastane and polyester, UHMWPE combined with elastane and nylon and glass fibre, UHMWPE combined with elastane and polyester and glass fibre, UHMWPE combined with elastane and nylon and stainless steel, UHMWPE combined with elastane and polyester and stainless steel, aromatic polyamides (para-aramids) combined with elastane and polyester, aromatic polyamides (para-aramids) combined with elastane and nylon, aromatic polyamides (para-aramids) combined with elastane and polyester and glass fibre, aromatic polyamides (para-aramids) combined with elastane and nylon and glass fibre, aromatic polyamides (para-aramids) combined with elastane and polyester and stainless steel, aromatic polyamides (para-aramids) combined with elastane and nylon and stainless steel, UHMWPE fibre and nylon, and UHMWPE fibre and polyester. These fabrics provide good absorbance of fluorocarbon polymer. Preferably the fabric portion is knitted or woven.

When the method comprises the step of removing excess fluorocarbon polymer from the glove, it may further comprise a step of returning fluorocarbon polymer removed from the glove back into the liquid comprising the fluorocarbon polymer in step ii). This provides a more cost efficient process in which only a minimal amount of fluorocarbon polymer is required.

In a further aspect of the invention there is provided a glove according to claim 15. The surface portion is a part of the outer layer which is exposed on the outside of the glove. It is the part which comes into contact with oil, water and contaminants when the glove is in use. The sub-surface portion is not exposed. It lies between the surface portion of the outer layer of the glove and the fabric portion of the glove.

The alternative characteristics of the fluorocarbon polymer discussed above in relation to the method of the invention apply equally to the glove according to the invention.

The first polymer (which is present in the outer layer) may comprise one or more polymers selected from the group of; polyurethane, styrene butadiene rubber, nitrile butadiene rubber, latex rubber, polydimethylsiloxane rubber, and thermoplastic elastomers.

The fabric portion may comprise one or more of nylon, polyester, cotton, a polyester and cotton blend, a polyester and nylon blend, ultra high molecular weight polyethylene (UHMWPE) combined with elastane and nylon, UHMWPE combined with elastane and polyester, UHMWPE combined with elastane and nylon and glass fibre, UHMWPE combined with elastane and polyester and glass fibre, UHMWPE combined with elastane and nylon and stainless steel, UHMWPE combined with elastane and polyester and stainless steel, aromatic polyamides (para-aramids) combined with elastane and polyester, aromatic polyamides (para-aramids) combined with elastane and nylon, aromatic polyamides (para-aramids) combined with elastane and polyester and glass fibre, aromatic polyamides (para-aramids) combined with elastane and nylon and glass fibre, aromatic polyamides (para-aramids) combined with elastane and polyester and stainless steel, aromatic polyamides (para-aramids) combined with elastane and nylon and stainless steel, UHMWPE fibre and nylon, and UHMWPE fibre and polyester. These fabrics provide good absorbance of fluorocarbon polymer. Preferably the fabric portion is knitted or woven.

The outer layer may have been dip, spray, dot or transfer coated onto the fabric portion.

Preferred embodiments of gloves according to the invention may comprise the following fabric and first polymer combinations. Preferred embodiments of the methods according to the invention may also utilize gloves comprising the following fabric and first polymer combinations.

Embodiment number	Fabric component	First polymer component
1	Ultra high molecular weight polyethylene, elastane, nylon and glass fibre	Nitrile butadiene rubber
2	Ultra high molecular weight polyethylene, elastane and nylon	Polyurethane
3	Ultra high molecular weight polyethylene, elastane, nylon and glass fibre	Polyurethane
4	Nylon and elastane	Polyurethane
5	Nylon and elastane	Microfoam nitrile

		butadiene rubber
6	Polyester, nylon and elastane	Foamed nitrile butadiene
7	Nylon	Polyurethane
8	Nylon	Nitrile butadiene rubber
9	Nylon and elastane	Polyurethane
10	Polyester, nylon and elastane	Foamed nitrile butadiene rubber
11	Ultra high molecular weight polyethylene, elastane and nylon	Polyurethane
12	Ultra high molecular weight polyethylene, elastane and nylon	Polyurethane
13	Ultra high molecular weight polyethylene, elastane, nylon and glass fibre	Foamed nitrile butadiene rubber
14	Ultra high molecular weight polyethylene, elastane, nylon and glass fibre	Polyurethane
15	Ultra high molecular weight polyethylene, elastane, nylon and glass fibre	Microfoam nitrile butadiene rubber
16	Aromatic polyamides (para-aramids), elastane, polyester and glass fibre	Textured nitrile butadiene rubber
17	Nylon and polyester	Textured nitrile butadiene rubber
18	Aromatic polyamides (para-aramids), elastane and polyester	Textured nitrile butadiene rubber

Embodiments 5 and 6 have a water and oil repellence which has a particularly good wash durability, when line dried or tumble dried. Embodiments 10, 11 and 13 have particularly high water and oil repellence. Further benefits of embodiments 1-18 are apparent from the examples and data described herein.

Preferred embodiments of gloves according to the invention may have foamed or microfoamed first polymer components. Preferred embodiments of the methods according to the invention may also utilize gloves having foamed or microfoamed first polymer components. This provides a surface to which the fluorocarbon polymer may easily adhere. This provides gloves with a high water/oil repellence and a high wash durability. The foamed or microfoamed first polymer components may comprise nitrile butadiene or styrene butadiene rubber.

Preferably the fluorocarbon polymer contains no perfluorooctanesulfonic acid (PFOS) and less than 5ppb perfluorooctanoic acid (PFOA).

In a further aspect of the invention there is provided a glove obtainable by a method according to the invention. The gloves according to the invention or the gloves which may be treated using the method according to the invention may have outer layers according to any of figures 3, 4 or 5. That is, the gloves may have an outer layer which covers substantially all of the fabric portion, as in figure 5. They may have an outer layer which extends to completely cover the finger and thumb portions of the glove and over the back of the glove to beyond a point where the fingers and thumb join to the rest of the glove, as in figures 3 or 4. Such gloves are sold under the marks TG190, TG385 and TG540 by Traffi Safe Ltd, of Maxx House, Western Road, Bracknell, Berkshire, RG12 1QP, United Kingdom.

Embodiments of the invention will now be described with reference to the data below and figures 1 and 2.

In order to evaluate oil and water repellence, two standard tests were used. The first is the oil drop rating test of the American Association of Textile Chemists and Colorists (AATCC Test Method 118-2013). This test is detailed in the AATCC Test Manual. In the test drops of standard test liquids, consisting of a selected series of hydrocarbons with varying surface tensions, are placed on the fabric surface and observed for wetting, wicking, and contact angle. The oil repellence grade is the highest numbered test liquid which does not wet the fabric surface. The ratings for this test are shown in table 1.

Table 1

OIL DROP RATING TEST SOLUTION	COMPOSITION
1	Kaydol (mineral oil)
2	65 / 35 kaydol / n hexadecane
3	n hexadecane
4	n tetradecane
5	n dodecane
6	n decane

7	n octane
8	n heptane

The second standard test used is the water drop rating test (the Scotchgard® test method). In the test drops of standard test liquids, consisting of a selected series of compositions with varying proportions of isopropanol (IPA) and water and therefore varying surface tensions, are placed on the fabric surface and observed for wetting, wicking, and contact angle. The water repellence grade is the highest numbered test liquid which does not wet the fabric surface. The ratings for this test are shown in table 2.

Table 2

WATER DROP RATING TEST SOLUTION	IPA % BY VOLUME	WATER % BY VOLUME
1	10	90
2	20	80
3	30	70
4	40	60
5	50	50
6	60	40
7	70	30
8	80	20
9	90	10
10	100	0

Example 1

Six batches of gloves were provided. Each of the batches consisted of fabric gloves which have a polymer coating covering at least a part of a fabric component. The fabric and polymer components of each batch of gloves are shown in table 3.

Table 3

Batch number	Fabric component	Polymer component
1	Ultra high molecular weight polyethylene, elastane, nylon, glass fibre	Nitrile butadiene

		rubber
2	Ultra high molecular weight polyethylene, elastane, nylon	Polyurethane
3	Ultra high molecular weight polyethylene, elastane, nylon, glass fibre	Polyurethane
4	Nylon, elastane	Polyurethane
5	Nylon, elastane	Microfoam nitrile butadiene rubber
6	Polyester, nylon, elastane	Foamed nitrile butadiene

Figures 1 and 2 show an example of the gloves of batch 3. Figure 1 shows the back of a dip coated fabric glove. The black polyurethane layer (101) has been dip coated onto the fabric portion (102). The inside of the fabric portion (102) contacts the user's hand. The fabric portion is made from ultra high molecular weight polyethylene, elastane, nylon and glass fibre. The glass fibre provides cut resistance. An elasticated wrist portion (103) is provided to ensure that the glove fits snugly around a user's wrist. Figure 2 shows the palm of the glove shown in figure 1.

It should be noted that the gloves of batch 6 have no exposed fabric. The polymer layer completely covers the fabric.

The following method was repeated for each of the 6 batches of gloves. Additionally, the gloves of batch 3 were pre-scoured in water at 40˚C, before treatment.

A water bath containing Texfin® FC6 was prepared. The ratio of the mass of the liquid in the water bath to the mass of the gloves to be treated (in each batch), ie. the liquor ratio, was 6:1. The amount of Texfin® FC6 in the bath for each batch was 3% (by mass) of the mass of the gloves in each batch. The pH of the bath was adjusted to 4.5 using an appropriate amount of ethanoic acid. The bath was heated to 40˚C. The batch of gloves were then submerged in the water/Texfin® FC6 bath for 30 minutes. The temperature of the bath was maintained at 40˚C during this time. Agitation was provided to the bath.

The gloves were then removed from the bath and hydro-extracted for 2 minutes leaving only 60% of residual moisture in the gloves. A suitable hydroextractor is a centrifuge, which has an internal drum comprising a wall of perforated metal. The drum rotates at high speed throwing any water/moisture in the drum outside of the drum. The use of hydroextractors significantly reduces the energy required to dry a material. The gloves were then tumble dried at 70˚C for 30 minutes. The gloves were then cured in an oven at 120 ˚C for 20 minutes.

The oil and water repellence for the fabric and polymer components of each batch are shown in table 4.

Table 4

Batch number	FABRIC COMPONENT		POLYMER COMPONENT	
	OIL RATING	WATER DROP RATING	OIL RATING	WATER DROP RATING
1	6	9-10	3	5
2	6	9-10	5	8-9
3	5-6	9-10	5	8-9
4	6	9-10	3-4	5
5	6	9-10	5-6	9-10
6	N/A	N/A	5-6	8-9

All untreated gloves had an oil drop rating of 0 and a water drop rating of 0 on both the fabric (with the exception of batch 6, see below) and polymer components. It is evidently possible to obtain excellent levels of oil and water repellence on all of the gloves tested. It should be noted that the gloves of batch 6 have no exposed fabric. The polymer layer completely covers the fabric. Hence, no oil or water drop rating is available for the fabric component of these gloves.

Example 2

In this example the wash durability of the batches of gloves produced in example 1 was evaluated.

The results are shown in table 5. The 'initial performance' is obtained when the gloves treated according to example 1 have undergone no washes. First samples of each batch were washed once at 40 ˚C according to the standard ISO 6330 5A. Some gloves of the first samples were line dried and some were tumble dried. A second sample of each batch was washed three times at 40˚C according to the standard ISO 6330 5A.

Table 5

BATCH NUMBER	FABRIC COMPONENT		POLYMER COMPONENT	
	OIL RATING	WATER DROP RATING	OIL RATING	WATER DROP RATING
INITIAL PERFORMANCE				
1	6	9-10	3	5
2	6	9-10	5	8-9
3	5-6	9-10	5	8-9
4	6	9-10	3-4	5
5	6	9-10	5-6	9-10
6	N/A	N/A	5-6	8-9
WASHED ONCE – LINE DRIED ONLY				
1	4	6	2-3	4
2	5	8	4	6
3	3	4	4	5
4	5	8	3	4-5
5	5	9	4-5	9
6	N/A	N/A	4	5
WASHED ONCE – TUMBLE DRIED				
1	5	8	2-3	4
2	5	9	5	8-9
3	3	7-8	4	5
4	5	8	3	4-5
5	5	9	4-5	9
6	N/A	N/A	4	6
WASHED THREE TIMES – LINE DRIED ONLY				
1	3	6	1-2	4
2	5	8	3-4	6

3	2	4	3-4	4
4	3-4	6	2	4
4	3-4	6	3-4	6
6	N/A	N/A	2	3
WASHED THREE TIMES – TUMBLE DRIED				
1	3	6	1-2	4
2	5	8	3-4	6-7
3	2	5-6	3-4	5
4	3-4	7	2	4
5	3-4	7	3-4	6-7
6	N/A	N/A	2	3

It is evident that excellent levels of both oil and water repellence are provided, even after multiple washes.

Example 3

Further batches of gloves according to table 6 were treated.

Table 6

Batch number	Fabric component	Polymer component
7	Nylon	Polyurethane
8	Nylon	Nitrile butadiene rubber
9	Nylon, elastane	Polyurethane
10	Polyester, nylon, elastane	Foamed nitrile butadiene rubber
11	Ultra high molecular weight polyethylene, elastane, nylon	Polyurethane
12	Ultra high molecular weight polyethylene, elastane, nylon	Polyurethane
13	Ultra high molecular weight polyethylene, elastane, nylon, glass fibre	Foamed nitrile butadiene rubber
14	Ultra high molecular weight polyethylene, elastane, nylon, glass fibre	Polyurethane
15	Ultra high molecular weight polyethylene, elastane, nylon, glass fibre	Microfoam nitrile butadiene rubber

These batches were treated according to a process which was identical to the process described for example 1.

The oil and water drop test results are shown in table 7.

Table 7

Batch number	FABRIC COMPONENT		POLYMER COMPONENT	
	OIL RATING	WATER DROP RATING	OIL RATING	WATER DROP RATING
7	5	9-10	4	5
8	5	10	3	4-5
9	5	9-10	3-4	4-5
10	N/A	N/A	4-5	6
11	5-6	10	3-4	5-6
12	5-6	10	3	4-5
13	5-6	9	5	5-6
14	5-6	10	3	5
15	5	9-10	3-5	5

It is evident that excellent levels of both oil and water repellence are provided. It should be noted that the gloves of batch 10 have no exposed fabric. The polymer layer completely covers the fabric. Hence, no oil or water drop rating is available for the fabric component of these gloves.

Example 4

A further three batches (16, 17 and 18) of gloves were treated. All of these batches had a textured nitrile butadiene rubber polymer component. Batch 16 had a fabric component comprising aromatic polyamides (para-aramids), elastane, polyester and glass fibre. Batch 17 had a fabric component comprising nylon and polyester. Batch 18 had a fabric component comprising aromatic polyamides (para-aramids), elastane and polyester. The treatment process was identical to the process described for example 1 above.

The oil and water drop test results are shown in table 8.

Table 8

BATCH NUMBER	FABRIC COMPONENT		POLYMER COMPONENT	
	OIL RATING	WATER DROP RATING	OIL RATING	WATER DROP RATING
16	5	9-10	3-4	4-5
17	5	9-10	3-4	4-5
18	4-5	7-8	3	4

It is evident that excellent levels of both oil and water repellence are provided.

The Texfin® FC6 used in all of the examples contains no perfluorooctanesulfonic acid (PFOS) and less than 5ppb perfluorooctanoic acid (PFOA).

Claims

1. A method for treating a glove or gloves comprising the steps of;

i) providing a glove having;

a fabric portion and an outer layer, which outer layer comprises a first cured polymer and is disposed on the outside of the fabric portion,

ii) contacting the fabric portion and the outer layer of the glove with a liquid comprising a fluorocarbon polymer which has a curing temperature of between 60 and 130˚C, and

iii) curing the fluorocarbon polymer at a temperature of between 60 and 130˚C,

wherein the first cured polymer comprises one or more polymers selected from the group of; polyurethane, styrene butadiene rubber, nitrile butadiene rubber, latex rubber, polydimethylsiloxane rubber, and thermoplastic elastomers.

2. A method according to claim 1 wherein the step of curing the glove is conducted at a temperature of between 115 -125 ˚C.

3. A method according to either of claims 1 or 2 wherein in step ii) the fabric portion and the outer layer are submerged in a bath comprising water and the liquid comprising the fluorocarbon polymer, and wherein the method further comprises the step of removing the glove from the bath, after step ii).

4. A method according to any preceding claim further comprising the step of removing excess flurocarbon polymer from the glove after step ii).

5. A method according to any preceding claim wherein the pH of the liquid comprising the fluorocarbon polymer is between 4.0 and 6.0 and preferably between 5.4 and 5.6.

6. A method according to any preceding claim wherein the mass of the fluorocarbon polymer is between 1% and 10% of the mass of the glove or gloves to be treated and is preferably between 1 and 4% of the mass of the glove or gloves to be treated.

7. A method according to claim 3 wherein the bath is agitated.

8. A method according to claim 4 wherein step of removing excess flurocarbon polymer from the glove comprises a step of hydroextraction, preferably to remove at least 40% by weight of the residual liquid which comprises the fluorocarbon polymer.

9. A method according claim 4 wherein the step of removing excess flurocarbon polymer from the glove comprises tumble drying the glove at a temperature of between 20 and 100 °C.

10. A method according to any preceding claim wherein the temperature of the liquid comprising the fluorocarbon polymer is between 30 and 100 °C, preferably between 40 and 80°C, and preferably between 40 and 45 °C when the glove is contacted with said liquid.

11. A method according to any preceding claim wherein step ii) has a duration of between 20 and 30 minutes.

12. A method according to any preceding claim wherein the fabric portion comprises one or more of;
nylon,
polyester,
cotton,
a polyester and cotton blend,
a polyester and nylon blend,
ultra high molecular weight polyethylene (UHMWPE) combined with elastane and nylon,
UHMWPE combined with elastane and polyester,
UHMWPE combined with elastane and nylon and glass fibre,
UHMWPE combined with elastane and polyester and glass fibre,
UHMWPE combined with elastane and nylon and stainless steel,
UHMWPE combined with elastane and polyester and stainless steel,
aromatic polyamides (para-aramids) combined with elastane and polyester,
aromatic polyamides (para-aramids) combined with elastane and nylon,
aromatic polyamides (para-aramids) combined with elastane and polyester and glass fibre,

aromatic polyamides (para-aramids) combined with elastane and nylon and glass fibre,
aromatic polyamides (para-aramids) combined with elastane and polyester and stainless steel,
aromatic polyamides (para-aramids) combined with elastane and nylon and stainless steel,
UHMWPE fibre and nylon, and
UHMWPE fibre and polyester.

13. A method according to any of claims 4, 8 and 9, further comprising a step of returning fluorocarbon polymer removed from the glove back into the liquid comprising the fluorocarbon polymer in step ii).

14. A glove comprising a fabric portion and an outer layer, which outer layer comprises a first cured polymer and is disposed on the outside of the fabric portion,

wherein the outer layer comprises a surface portion and a sub-surface portion,

wherein the fabric portion and the surface portion of the outer layer both comprise a cured fluorocarbon polymer which has a curing temperature of between 60 and 130˚C,

wherein the sub-surface portion of the outer layer contains substantially no fluorocarbon polymer, and

wherein the first cured polymer comprises one or more polymers selected from the group of; polyurethane, styrene butadiene rubber, nitrile butadiene rubber, latex rubber, polydimethylsiloxane rubber, and thermoplastic elastomers.

15. A glove according to claim 14 wherein the fabric portion comprises one or more of;
nylon,
polyester,
cotton,
a polyester and cotton blend,
a polyester and nylon blend,
ultra high molecular weight polyethylene (UHMWPE) combined with elastane and nylon,
UHMWPE combined with elastane and polyester,
UHMWPE combined with elastane and nylon and glass fibre,
UHMWPE combined with elastane and polyester and glass fibre,
UHMWPE combined with elastane and nylon and stainless steel,
UHMWPE combined with elastane and polyester and stainless steel,

aromatic polyamides (para-aramids) combined with elastane and polyester,
aromatic polyamides (para-aramids) combined with elastane and nylon,
aromatic polyamides (para-aramids) combined with elastane and polyester and glass fibre,
aromatic polyamides (para-aramids) combined with elastane and nylon and glass fibre,
aromatic polyamides (para-aramids) combined with elastane and polyester and stainless steel,
aromatic polyamides (para-aramids) combined with elastane and nylon and stainless steel,
UHMWPE fibre and nylon, and
UHMWPE fibre and polyester.

16. A glove according to either of claims 14 or 15 wherein the outer layer is dip, spray, dot or transfer coated onto the fabric portion.