# Patent Alert May 2026

**This month's selection in brief**

This month's patent alert highlights recent innovations in PFAS-free technologies for textile materials. Per- and polyfluoroalkyl substances (PFAS), often referred to as "forever chemicals" due to their extreme persistence in the environment, are among the most concerning classes of contaminants found in a wide range of consumer and industrial products. As regulatory pressure and environmental concerns continue to increase, significant research efforts have been directed toward the development of safer and more sustainable alternatives. The patents selected below demonstrate strong innovation activity in silicon-based materials, wax-based technologies, polyurethane and methacrylate crosslinking systems, with a particular emphasis on bio-based raw materials as potential substitutes for PFAS in textile applications.

## Contents

# 1. Fluorine-free and silicon-free durable water repellent compositions with low chemical footprint

Patent number: WO2025/125350 A1

Publication date: 2025-06-19

Applicant(s): SWISS PERFORMANCE CHEMICALS AG [CH]

Inventor(s): RUSHFORTH MIKE [CH]; FOESSEL MATTHIAS [CH]; MHEIDLE MICKAEL [CH]

**Summary**

The invention relates to treatments of fibrous substrates for obtaining a durable water repellent effect. The methods described prove to be environmentally friendly and allow the use of renewable starting materials. Specifically, impregnating dispersions, concentrate dispersions, corresponding kit of parts are disclosed, each comprising candelilla wax and a NF-Polymer which is free of an isocyanate-based extender, and free of fluorine, and preferably has a critical surface energy of 20-28mN/m and/or a water repellency index of at least Spray 70. Further provided are methods to prepare concentrate dispersions, impregnating dispersions and treatment of fabrics. The fabrics treated with the inventive impregnating dispersions show unexpected beneficial properties, when compared to known treatments and include improved water repellency, even after multiple washing cycles and for a wide variety of fabrics. The thus obtained fabrics are applicable in a wide variety of applications, including outdoor clothing and protective clothing.

Padding compositions

| **Test Serie No** | | **3.3 comparative** | **3.8 comparative** | **3.11 inventive** |
|---|---|---|---|---|
| | | blocked Isocyanate + Candelilla | Candelilla | NF-Polymer + Candelilla |
| **Product name** | | | | |
| EMUL 3297-3 (Candelilla 2) | % | 10 | 10 | 10 |
| Extender TTL 2.0 | % | 3 | 0 | 0 |
| NF-Polymer | % | 0 | 0 | 2 |
| Acetic acid 10% | g/l | 10 | 10 | 10 |

# 2. Non-fluorinated nonwoven and paper media having high hydrophobicity and processes for making the same

Patent number: WO2025181249A1

Publication date: 2025-09-04

Applicant(s): AHLSTROM OYJ [FI]

Inventor(s): SOIKKELI OUTI [FI]; BILLOD ELISE [FR]; HEINO HELINÄ [FI]; PIGEOT-REMY STÉPHANIE [FR]; PROST CLAIRE [FR]; LIONS BRUNO [FR]; MERLET SAMUEL [FR]

**Summary**

A fluorine-free chemical treatment applicable to nonwoven media to provide high hydrophobicity and glue repellency without impacting product porosity/permeability. The fluorine-free chemical treatment incudes application of a water repellent including an acrylate copolymer optionally containing silicon functionalities, and/or optionally admixed with a polyurethane resin compound. The acrylate copolymer is used in combination with a non-fluorinated hydrophobic binder including a styrene moiety. Also disclosed are non-woven media including the acrylate copolymer containing silicon functionalities, and/or admixed with a polyurethane resin compound.

Table 1.

| | Comparative Example 1.1 | Comparative Example 1.2 | Comparative Example 1.3 | Inventive Example 1 |
|---|---|---|---|---|
| Water Repellent | Ecoperl 4 (CHT)-biobased functionalized ionic polymer/wax | Nuv N2155-C-6 fluorocarbon | Synthro Wax NC406D-Carnauba type 3 wax non-ionic emulsion | Daikin XP-8001-Non-fluorinated Acrylate Copolymer |
| Dry-end Hydrophobic Binder | Styrene acrylate | Styrene acrylate | Styrene acrylate | Styrene acrylate |
| Cobb (top 2 h ($g/m^2$) | 134 | 22 | 138 | 25.6 |

# 3. Water-repellent and oil-resistant agent, textile product, and production method for textile product

Patent number: WO2024143275A1

Publication date: 2024-07-04

Applicant(s): DAIKIN IND LTD [JP]

Inventor(s): MINAMI SHINICHI [JP]; TAKEUCHI RUMI [JP]; KASHIWAGI MASATO [JP]; YAMAMOTO IKUO [JP]

**Summary**

Provided is a water-repellent and oil-resistant agent that has, as a whole, a high biobased carbon content, and that is capable of imparting sufficient water repellency and/or oil resistance to an object to be treated. Furthermore, provided are: a textile product having adhered thereto the water-repellent and oil-resistant agent; and a method for producing a textile product using the water-repellent and oil-resistant agent. The water-repellent and oil-resistant agent comprises a liquid medium and a fluorine-free compound as the main component, and has a biobased carbon content of at least 40% as measured in accordance with ASTM D6866. The fluorine-free compound may have a hydrocarbon group having 7-40 carbon atoms.

| | | Example | | Comparative Example | |
|---|---|---|---|---|---|
| | | 2 | 7 | 2 | 4 |
| Non-fluorine water-repellent and oil-resistant agent B (mass proportion) | | 100 | 80 | 0 | 50 |
| Petroleum-based water-repellent and oil-resistant agent (mass proportion) | | 0 | 20 | 100 | 50 |
| Bio-based carbon content of water-repellent and oil-resistant agent | | 60% | 48% | 0.20% | 30% |
| Water-repellency (No.) | Initial | 100 | 100 | 90 | 100 |
| | Washed five times | 100 | 95 | 80 | 90 |
| | Washed ten times | 90 | 90 | 80 | 80 |

# 4. Wash-resistant textile hydrophobisation

Patent number: WO2024218106A1

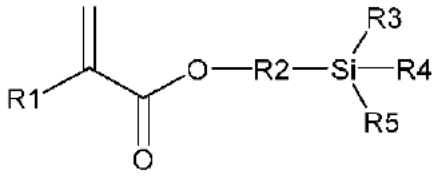
Publication date: ·2024-10-24

Applicant(s): WACKER CHEMIE AG [DE]

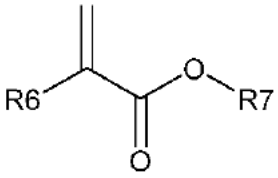
Inventor(s): DENK ALINA [DE]; BAUMANN MARTINA [DE]; DELLERMANN THERESA [DE]; WALCH RAMONA [DE]; WEITZEL HANS-PETER [DE]

**Summary**

The invention relates to siloxane-based fluorocarbon substitutes for textile coating which are associated with excellent, reactivatable hydrophobicity and high wash resistance. Therefore, the invention relates to a polymer that can be obtained by radical polymerisation of a starting mixture comprising (i) at least one ethylenically unsaturated, silicon-containing monomer of chemical formula (I), (ii) at least one active monomer, and (iii) optionally at least one ethylenically unsaturated monomer of chemical formula (II).




(I)




(II)

# 5. Urethane compounds for finishing textile sheet materials in a fluorine-free manner

Patent number: EP4355805A1

Publication date: 2024-04-24

Applicant(s): EVONIK OPERATIONS GMBH [DE]

Inventor(s):
RICHRATH RUBEN BENEDIKT [DE]; PLATTE GABRIELE [DE]; PFEIFFER NICOLE [DE]; BERGFRIED STEFAN [DE]; DAHL VERENA [DE]; STREMMER KATHRIN [DE]; RADLOFF SARAH [DE]; RÖBEN CAREN [DE]; BAGUS NINO [DE]; VON HOF JAN MARIAN [DE]

**Summary**

The invention relates to a urethane compound containing at least one structural unit (A), said structural unit (A) being a polyglycerin structural unit with at least three groups R1, each of which is selected independently of one another from C3-C39 hydrocarbon groups that optionally contain heteroatoms other than fluorine atoms; to a method for producing one or more of the aforementioned urethane compounds; to compositions which contain one or more of the aforementioned urethane compounds; to a method for impregnating textile sheet materials so as to be water- and/or oil-repellant using one or more of the aforementioned urethane compounds; and to textile sheet materials which can be obtained according to the aforementioned method.

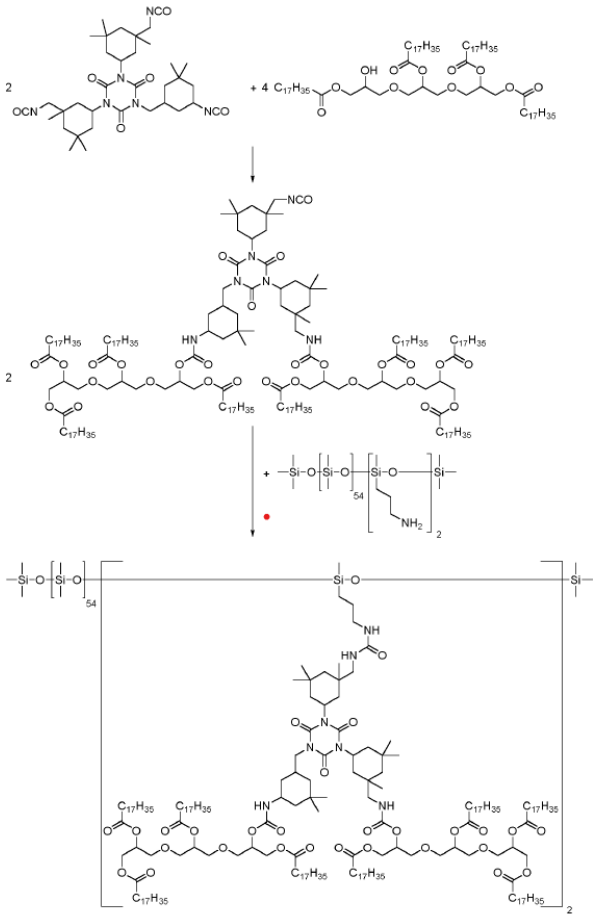


FIG. 1

# 6. Compositions for treating surfaces

Patent number: WO2025172516A1

Publication date: 2025-08-21

Applicant(s): RUDOLF GMBH [DE]

Inventor(s): SIELEMANN DIRK [DE]; LINDHORST ANJA [DE]; HEPP JONAS [DE]; HEIMGREITER JOHANN [DE]

**Summary**

The invention relates to preparations comprising a polyurethane and/or polyurea and a copolymer, and to the use thereof as an anhydrous product for treating surfaces.

| | | | Materialien | SL 1 | SL 2 | SL 3 | SL 4 | SL 5 | SL 6 | SL 7 | SL 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Verbindung (A) | (a) | (a1) | Glycerin | 92,1 | 92,1 | 92,1 | | | | | |
| | | (a2) | Triethanolamin | | | | 149,0 | 149,0 | | | |
| | | (a3) | Bis(aminoethyl)amin | | | | | | 103,0 | 103,0 | 103,0 |
| | (b) | (b1) | Laurinsäure | | | | | 400,0 | | | |
| | | | Palmitinsäure | | 512,0 | 512,0 | | | | | |
| | | | Stearinsäure | | | | 568,0 | | | | |
| | | | Behensäure | | | | | | 680,0 | | 680,0 |
| | | (b2) | Stearylisocyanat | 591,0 | | | | | | 591,0 | |
| | Endtemperatur (T) in °C | | | 90 | 160 | 160 | 165 | 160 | 165 | 90 | 160 |
| | Säurezahl (SZ) | | | | < 5 | <5 | <10 | <5 | <5 | | <5 |
| Umsetzungsprodukt (S) (= Komponente (1)) | Verbindung (A) | | | 123,0 | 156,0 | 156,0 | 141,0 | 134,0 | 113,0 | 128,0 | 113,0 |
| | Bis(octadecyl)amin | | | | | | | | | | 10,4 |
| | Dimethylaminoethanol | | | | | 5,4 | | | | | |
| | Isocyanat (IC) | | 2,4-Toluylendiisocyanat/Trimethylol-propanurethan mit 13,5 Gew.-% NCO | 56,3 | | | 64,7 | | 47,3 | | 41,0 |
| | | | Hexamethylendiisocyanat-Trimer mit 21,7 Gew.-% NCO | | 53,1 | 41,4 | | 50,5 | | 35,7 | |
| | Lösemittel (LM) | | Isopropylacetat | 179 | 209 | | 206 | | 160 | 164 | |
| | | | Ethylacetat | | | | | 184 | | | |
| | | | Dipropylenglykoldimethylether | | | 203 | | | | | |
| | | | 1-Methoxy-2-propylacetat | | | | | | | | 164 |

# 7. Water-repellent textile

Patent number: WO2024041476A1

Publication date: 2024-02-29

Applicant(s): TORAY INDUSTRIES [JP]

Inventor(s): ZHANG TIANCHI [CN]; HUANG YUNYUN [CN]; LUO ZHOURONG [CN]


**Summary**

A water-repellent textile. The surfaces of single fibers forming the water-repellent textile are covered with a resin film, the thickness of the resin film is 60-100 nm, and the main components of the resin film are a non-fluorine-based water-repellent compound and an isocyanate compound. The water-repellent textile has more excellent water repellence and washing durability, has good hand feeling, and is safe and environmentally-friendly.


[Table 1]

| | | | Embodiment 9 | Embodiment 10 | Embodiment 11 | Embodiment 12 | Embodiment 13 | Embodiment 14 | Comparative example 1 | Comparative example 2 |
|---|---|---|---|---|---|---|---|---|---|---|
| Base cloth | Fiber type | | Polyester | Polyester | Polyester | Polyester | Polyester | Polyester | Polyester | Polyester |
| Treatment solution | Water repellent | Type | A | A | A | A | A | A | A | A |
| | | Amount (g/L) | 30 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| | Crosslinker | Type | A | A | A | A | C | E | - | D |
| | | Amount (g/L) | 30 | 10 | 50 | 30 | 30 | 30 | | 30 |
| | Softener | Type | A | A | A | A | A | A | A | A |
| | | Amount (g/L) | 10 | 10 | 10 | 30 | 10 | 10 | 10 | 10 |
| Textile | Thickness of resin film (nm) | Not washed | 60 | 80 | 80 | 80 | 80 | 70 | 60 | 80 |
| | | Washed for100 times | 40 | 40 | 55 | 50 | 50 | 45 | 20 | 30 |
| | Water repellency (level) | Not washed | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 |
| | | Washed for100 times | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 2 |
| | Hand feel | Stiffness (mm) | 43 | 40 | 52 | 46 | 45 | 50 | 38 | 48 |

Water repellent A: A copolymer of a hydrocarbon compound and a polysiloxane compound, with the trade name of RUCO-DRY DHT and the manufacturer of Rudolf Chemical
Crosslinker A: a self-made polymer formed from an aromatic isocyanate compound and a polyol
Crosslinker B: aliphatic isocyanate, with the trade name of FB-12, and the manufacturer of Shanghai Siwo Polymer Materials Co., Ltd.
Crosslinker C: aromatic isocyanate (excluding polyols), with the trade name of XDI, and the manufacturer of Mitsui Chemicals Inc.
Crosslinker D: melamine, with the trade name of M-3, and the manufacturer of DIC Corporation.
Crosslinker E: a self-made polymer formed from an aromatic isocyanate compound and a polyol
Softener A: polysiloxane, with the trade name of S-1723, and the manufacturer of Nantong Dongrou Industry and Trade Co., Ltd.

# 8. Extender compounds for durable water repellence

Patent number: WO2024012662A1

Publication date: 2024-01-18

Applicant(s): HUNTSMAN TEXTILE EFFECTS GERMANY GMBH [DE]

Inventor(s): FUCHS ANDREAS [DE]; RETTENBACHER ISABELLA [DE]; SCHIDEK EDELTRAUD [DE]

**Summary**

The present invention relates to the use of a compound, which is the reaction product of: (i) at least one di- or poly-isocyanate; (ii) at least one aromatic compound selected from the group consisting of: (I) and (II) wherein R1, R2, R3, R4 and R5 are independently selected from the group consisting of H and C1-4 alkyl; Y is OH, NH2 or SH; X is O, N or S; and (iii) optionally one or more further reactants; as a non-reactive extender for durable water-repellence in textile fabrics. The present invention further relates to a durable water-repellence (DWR) system comprising at least one non-fluorinated water-repellent compound and at least one non-reactive extender compound as above, their use in water-repellent finishing of fibre materials, as well as a process for treating a textile fabric composed on fibre materials.

**Table 1**: Non-reactive extender compounds (NonREx 1-3) according to the invention and comparative extender (Comp. 1).

| | Component | Unit | NonREx 1 | NonREx 2 | NonREx 3 | Comp. 1 |
|---|---|---|---|---|---|---|
| Isocyanate | S. 2021 (2.5 NCO) | g | 90.5 | 90.5 | 60.7 | 90.5 |
| Alcohol | FFA | g | 29.4 | | 16.37 | |
| | BZA | g | | 32.4 | | |
| | SA | g | | | 8.91 | |
| Comparative | 2-HEA | g | | | | 34.8 |
| Others | TMP | g | 6.7 | 6.7 | 4.47 | 6.7 |
| | NMDEA | g | 2.98 | 2.98 | 1.96 | 2.98 |
| Solvent | MiBK | g | 240.35 | 246.22 | | 134.98 |
| | BuAc | g | | | 214.62 | |
| Organic Phase | Amount | g | 369.93 | 378.8 | 306.6 | 269.96 |
| | Dry content | % | 35.0 | 35.0 | 30.0 | 50 |

* S. 2021 = Suprasec® 2021
FFA = furfuryl alcohol
BZA = benzyl alcohol
SA = stearyl alcohol
2-HEA = 2-hydroxyethyl acrylate
TMP = 2,2,6,6-tetramethylpiperidine
NMDEA = *N*-methyl diethanolamine
MiBK = methyl-*iso*-butyl ketone
BuAc = butyl acetate