

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(PCT Rule 71.1)

To:

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Date of mailing
(day/month/year)

25.03.2021

Applicant's or agent's file reference
068023-00008

IMPORTANT NOTIFICATION

International application No.
PCT/US2019/068920

International filing date (day/month/year)
30.12.2019

Priority date (day/month/year)
31.12.2018

Applicant
ZYDEX INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international
preliminary examining authority:



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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 068023-00008	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/US2019/068920	International filing date (day/month/year) 30.12.2019	Priority date (day/month/year) 31.12.2018	
International Patent Classification (IPC) or national classification and IPC INV. C09K17/38			
Applicant ZYDEX INC.			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ (sent to the applicant and to the International Bureau) a total of <u>17</u> sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions). ☐ sheets containing rectifications, where the decision was made by this Authority not to take them into account because they were not authorized by or notified to this Authority at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2). ☐ superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)). b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in the form of an Annex C/ST.25 text file, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3ter of Annex C of the Administrative Instructions).			
4. This report contains indications relating to the following items: ☒ Box No. I Basis of the report ☐ 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 under Article 35(2) 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 international application ☐ Box No. VIII Certain observations on the international application			
Date of submission of the demand 22.10.2020		Date of completion of this report 25.03.2021	
Name and mailing address of the international preliminary examining authority:  European Patent Office P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Fax: +31 70 340 - 3016		Authorized officer Lehnert, Andreas Telephone No. +31 70 340-4234 	

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/US2019/068920

Box No. I Basis of the report

1. With regard to the **language**, this report is based on
- ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a) and (b))
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1-18 as originally filed

Claims, Numbers

1-34 filed with telefax on 15-01-2021

- ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.
3. ☒ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☒ the claims, Nos. 1-35
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)):
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
5. ☐ This report has been established:
- ☐ taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).
 - ☐ without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91(Rules 66.4bis and 70.2(e)).

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/US2019/068920

6. ☒ With regard to top-up searches (Rules 66.1 *ter* and 70.2(f)):
- ☒ A top-up search was carried out by this Authority on 06.11.2020 (all discovered documents are listed in the Supplemental Box Relating to Top-up Search).
 - ☐ Additional relevant documents have been discovered during the top-up search.
 - ☐ No top-up search was carried out by this Authority because it would serve no useful purpose.
7. ☐ Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

* If item 4 applies, some or all of those sheets may be marked "superseded".

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	<u>1-34</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-34</u>
Industrial applicability (IA)	Yes: Claims	<u>1-34</u>
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

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

- 1 Reference is made to the following document:

D1 EP 3 360 917 A1 (CHT R BEITLICH GMBH [DE]) 15 August 2018
(2018-08-15)
- 2 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claims 32-34 is not new.
 - 2.1 Claims for products defined in terms of processes for their preparation (known as "product-by-process" claims) are admissible only if the products themselves fulfil the requirements for patentability and there is no other information available in the application which could have enabled the applicant to define the product satisfactorily by reference to its composition, structure or some other testable parameter.

Once a product itself is part of the state of the art and is thus not novel according to the criterion of novelty as set out in Article 33(2) PCT, the fact of defining this product by reference to a new process is irrelevant to the question of novelty. The use of a different parameter for defining a known product does not confer novelty on the product.

Claims 33-35 refer to a composition, comprising:
(a) at least one transesterified alkoxy silane; and
(b) soil.

The expression "transesterified" refers to a product produced by a particular process. It is, however, not limiting to the product as such. Any alkoxy silane can be produced by transesterification, thus the feature "transesterified" is not limiting. polyether modified siloxane A

In this respect, the polyether modified siloxane A of D1 falls under the definition of an alkoxy silane. The composition is used as a soil-conditioner, i.e. for soil stabilization. There is no difference between the subject-matter of claims 33-35 on file and the disclosure of D1.
 - 2.2 The objections raised in the Written Opinion of the International Searching Authority are maintained, also in view of the Applicant's comments received with letter of 22.10.2020.

D1 discloses (see D1, claims 1-15) a soil-conditioner comprising two siloxane components, called siloxane A and cationic modified siloxane B.

The polyether modified siloxane A contains hydroxy groups and the cationic modified siloxane B is an ionic silicone compound. Amine groups can be present as well.

With respect to the alleged distinguishing feature "water-soluble" it is observed that the siloxanes A and B are used in an emulsion in water.

In D1, paragraph [0060] the soil-conditioner is described: It consists of an emulsion of 25 wt% of siloxane A and 25 wt% of siloxane B in water, corresponding to a molar ratio of siloxane A to siloxane B of 8 to 1. The inventive soil-conditioner was applied to soil.

Thus, the application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claims 1-31 is not new.

With respect to the Applicant's comments that neither a transesterified alkoxy silane nor an amino-functional silane are disclosed in D1 the examiner would like to point out that the expression "transesterified" is understood in it's broadest scope to include any alkoxy silane, regardless if it is produced by a transesterification process or by another process as already discussed above.

An "alkoxy silane" is any silane having attached some kind of alkoxy groups. Thus, also a polyether modified silane in which the polyether is attached to the silane backbone via oxygen groups is an alkoxy silane.

The objections raised in the previous communication are maintained, also with respect to the amended claims on file.

IN THE EUROPEAN PATENT OFFICE
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

APPLICANT: ZYDEX INC.
INTERNATIONAL APPLICATION NO.: PCT/US2019/068920
INTERNATIONAL FILING DATE: 30 DECEMBER 2019
TITLE: SOIL STABILIZING COMPOSITIONS

Authorized Officer: Johannes Buter

European Patent Office
NL-2280 HV Rijswijk

RESPONSE TO THE FIRST
WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

Dear Officer Buter:

This communication is in response to the Written Opinion, dated 19 November 2020, from the International Preliminary Examining Authority (IPEA). Applicants have submitted herewith amendments under Article 34, as described more fully below, to correct certain defects in the claims and to more particularly distinguish the claimed invention from the cited references. In addition and as also described more fully below, Applicants have provided remarks explaining the patentability of the claimed invention to overcome the defects noted in the Written Opinion. Applicants respectfully request reconsideration in light of these amendments and remarks and issuance of a favorable International Preliminary Report on Patentability.

Independent claim 1 and 14 has been amended to include the subject matter of previously presented dependent claims 2 and 12. As such, no new matter has been introduced to independent claim 1.

A "marked-up" copy of the claims has been provided to easily identify the claim amendments. A clean copy of the amended claims is also provided with this response.

For the reasons provided below, Applicants respectfully submit that all claims are patentable over the cited references.

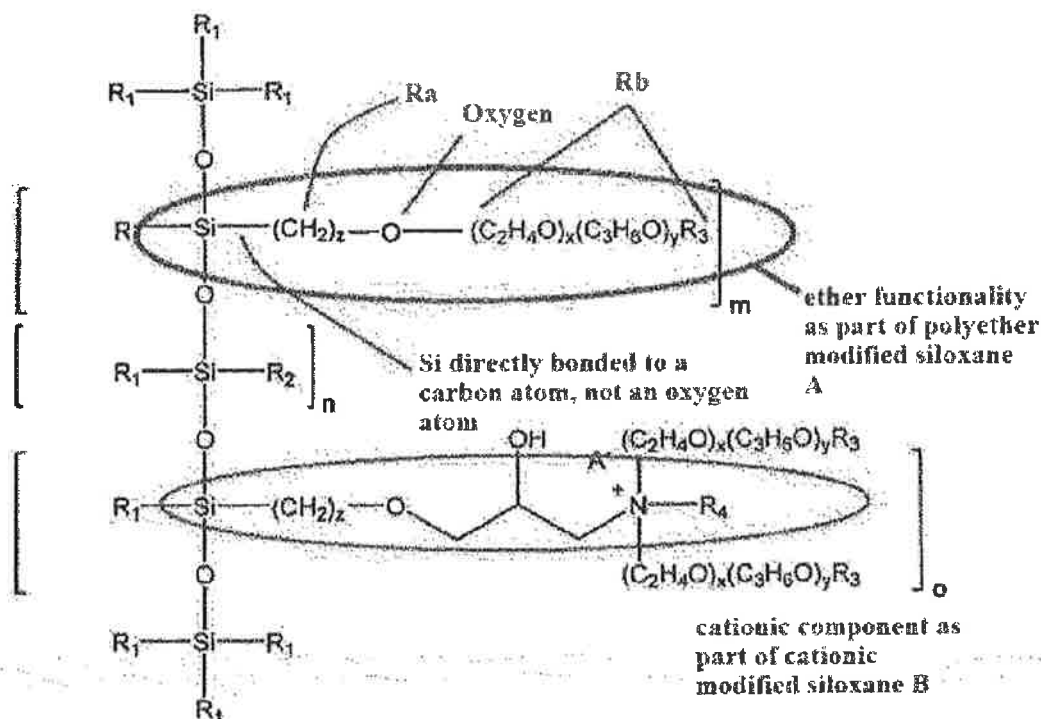
REMARKS

The Written Opinion finds that all claims (i.e., claims 1-35) lack novelty and inventive step in view of EP 3360917A ("D1"). Applicants respectfully disagree.

As part of the Written Opinion's arguments for maintaining the rejections based upon D1, the Written Opinion contends that polyether modified siloxane A of D1 contains hydroxy groups and reads on the claimed water soluble non-ionic organosilane (e.g., a transesterified alkoxy silane and/or amino-functional silane). The Written Opinion also argues that the claimed transesterified alkoxy silanes are product-by-process limitations, such that the term "transesterified" is not limiting. Based on this line of reasoning, the Written Opinion argues that the polyether modified siloxane A of D1 falls under the definition of an alkoxy silane. Applicants respectfully disagree with the Written Opinion's proposition that the claimed "transesterified alkoxy silanes" feature is a product-by-process limitation, in which the Written Opinion is effectively reading the "transesterified" limitation out of this feature.

With regard to the "transesterified alkoxy silane" issue, Applicants note that the specification specifically describes a "transesterified alkoxy silane" as a compound that generally includes a Si-O-R-OH group. In this regard, a the claimed "transesterified alkoxy silane" includes an alkoxy group including a hydroxyl group, which is hydrophilic, that is directly bonded to a silicon atom. In this regard, the term "transesterified" does not render this claimed feature as a product-by-process limitation. To the contrary, the term "transesterified" helps describe at least one aspect of the structure of such silanes.

Additionally, Applicants note that D1 does not teach or suggest a "transesterified alkoxy silane" as described in the present specification and claimed. For instance, the claimed "transesterified alkoxy silane" has at least one hydroxyl-containing alkoxy groups (e.g., Si-O-R-OH) directly bonded to a silicon atom. To the contrary, the polyether modified siloxane A of D1 has the following general ether functionality: Si-R_a-O-R_b-OH. In this regard, the silicon atom is not bonded to the oxygen atom but a carbon atom as part of R_a. Below is an annotated copy of formula 1 from D1 to help illustrate that the polyether modified siloxane A is structurally different from the claimed "transesterified alkoxy silane"



As noted above, D1 does not teach or suggest the claimed "transesterified alkoxy silane" aspect of the currently claimed invention. For instance the ether functionality of D1 does not include an oxygen atom directly bonded to a silicon atom.

The Written Opinion also argues that the cationic modified siloxane B of D1 reads on the claimed ionic organosilicon compound. The Written Opinion also specifically notes that amino functionality may be included in the cationic modified siloxane B of D1. In this regard, it appears that the Written Opinion has mistakenly associated the claimed amino-functional silanes with the ionic organosilicon compounds instead of the claimed water soluble non-ionic organosilane.

Applicants note that D1 appears to only teach amino-functionality associated with the cationic modified siloxane B. Accordingly, D1 does not teach or suggest a non-ionic amino-functional silane as claimed.

Accordingly, Applicants submit that all claims as currently presented are patentable over the prior art of record.

CONCLUSION

All of the points raised by the ISA and Written Opinion have now been addressed by the remarks provided above. Accordingly, Applicants respectfully request that a favorable International Preliminary Report on Patentability indicate the same.

Respectfully Submitted,



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Docket No.: 068023-00008

CLEAN CLAIMS

THAT WHICH IS CLAIMED:

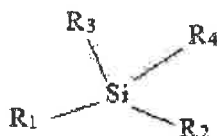
1. A composition for soil stabilization, comprising:

(a) at least one ionic organosilicon compound; and

(b) at least one water soluble non-ionic organosilane, wherein the at least one water soluble non-ionic organosilane comprises a transesterified alkoxy silane, an amino-functional silane, or a combination thereof;

wherein the composition comprises a liquid.

2. The composition of claim 1, wherein the transesterified alkoxy silane comprises a structure according to the formula:



wherein

R₁ comprises a substituted or non-substituted hydrocarbon radical;

R₂ comprises a first hydroxy-containing alkoxy radical;

R₃ comprises an alkoxy radical or a second hydroxy-containing alkoxy radical; and

R₄ comprises an alkoxy radical or a third hydroxy-containing alkoxy radical.

3. The composition of claim 2, wherein the first hydroxy-containing alkoxy radical, the second hydroxy-containing alkoxy radical, and the third hydroxy-containing alkoxy radical are the same.

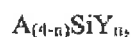
4. The composition of claim 2, wherein the first hydroxy-containing alkoxy radical is different than at least the second hydroxy-containing alkoxy radical.
5. The composition of claims 2-4, wherein R_1 comprises an alkyl radical.
6. The composition of claim 5, wherein the alkyl radical comprises a linear alkyl radical, a branched alkyl radical, or a cycloalkyl radical including from one to thirty carbon atoms.
7. The composition of claims 2-4, wherein R_1 comprises a substituted hydrocarbon radical having one or more of a halide atom, a nitrogen atom, or an oxygen atom.
8. The composition of claims 2-7, wherein at least the first hydroxy-containing alkoxy radical comprises $-[OCH_2CH_2]_aOH$ where 'a' has a value of 1 through 10, $-[OC_3H_6]_bOH$ where 'b' has a value of one through ten, or $[C_3H_7O_3]$.
9. The composition of claim 2-7, wherein the transesterified alkoxy silane comprises the first hydroxy-containing alkoxy radical and the second hydroxy-containing alkoxy radical, and wherein the first hydroxy-containing alkoxy radical and the second hydroxy-containing alkoxy radical each independently comprise $-(OCH_2CH_2)_aOH$ where 'a' has a value of 1 through 10, $-[OC_3H_6]_bOH$ where 'b' has a value of 1 through 10, or $[C_3H_7O_3]$.
10. The composition of claim 1, wherein the at least one water soluble non-ionic organosilane comprises an inherently or naturally water soluble organosilane.

11. The composition of claims 1-10, wherein the at least one water soluble non-ionic organosilane comprises a solubility in water of at least about 2.5 grams per Liter of water at a temperature of 20°C, such as at least about any of the following: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, and 60 g/L and/or at most about 150, 140, 130, 120, 110, 100, 90, 80, 70, and 60 g/L.

12. The composition of claims 10-11, wherein the at least one water soluble non-ionic organosilane comprises a bis-aminofunctional silane.

13. The composition of claims 1-12, wherein the amino-functional silane comprises N-(2-aminoethyl)-3-aminopropyltrimethoxysilane, N-aminoethylaminomethylphenyltrimethoxysilane, N-(2-aminoethyl)-3-aminopropyltris(2-ethylhexoxy)-silane, 3-aminopropyltrimethoxysilane, trimethoxysilyl-propyldiethylenetriamine, bis(2-hydroxyethyl)-3-aminopropyltrimethoxysilane, 2-methacryloxyethyltrimethyl-[3-trimethoxysilylpropyl] ammonium chloride, or any combination thereof.

14. The composition of claims 1-13, wherein the at least one water soluble non-ionic organosilane comprises a structure according to the following formula:



wherein, 'A' comprises a monovalent organic radical, 'Y' comprises a hydroxyl groups or a hydrolyzable radical, and n is 1, 2, or 3.

15. The composition of claim 14, wherein 'A' comprises an alkyl or aryl radical.

16. The composition of claims 14-15, wherein 'Y' comprises acetoxy radicals, alkoxy radicals with 1 to 6 carbon atoms.

17. The composition of claims 1-16, wherein the composition comprises at least one water soluble non-ionic organosilane comprising a transesterified alkoxy silane and at least one inherently or naturally water soluble non-ionic organosilane.

18. The composition of claims 1-17, wherein the composition is an aqueous solution or aqueous dispersion.

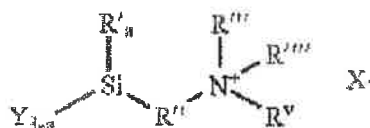
19. The compositions of claims 1-18, wherein the composition comprises less than 10% by weight, such less than 5% by weight, or less than 1% by weight of an organic solvent.

20. The composition of claims 1-19, wherein the composition is devoid of an organic solvent.

21. The composition of claims 1-20, wherein the composition comprises a weight ratio between the at least one water soluble non-ionic organosilane and the at least one ionic organosilicon compound comprising from about 98:2 to about 2:98; such as at most about any of the following: 95:5, 90:10, 85:15, 80:20, 75:25, 70:30, 65:45, 60:40, 55:45, 50:50, 45:55, and 40:60 and/or at least about any of the following: 2:98, 5:95, 10:90, 15:85, 20:80, 25:75, 30:70, 35:65, 40:60, 45:55, 50:50, 55:45, and 60:40.

22. The composition of claims 1-21, wherein the at least one ionic organosilicon compound comprises a cationic organosilicon compound.

23. The composition of claim 22, wherein the cationic organosilicon compound comprises a structure according to the formula:



wherein

Y is an alkoxy radical with 1 to 6 carbon atoms; 'a' has a value of zero; R'' is propylene; R''' is methyl or ethyl; R''' and R^v are identical or different alkyl groups containing from one to twenty-two carbon atoms, wherein at least one of R''' and R''' is larger than eight carbon atoms; and X is a halide, acetate, or tosylate.

24. The composition of claims 22-23, wherein the cationic organosilicon compound comprises 3-(trimethoxysilyl)propyldimethyloctadecyl ammonium chloride, 3-(trimethoxysilyl)propylmethyldidecyl ammonium chloride, or 3-(trimethoxysilyl)propyldimethylhexadecyl ammonium chloride.

25. The composition of claims 1-24, wherein the sum of the at least one ionic organosilicon compound and the at least one water soluble non-ionic organosilane comprises from about 5% to about 100% dissolved and/or suspended solids by weight.

26. The composition of claims 1-24, wherein the sum of the at least one ionic organosilicon compound and the at least one water soluble non-ionic organosilane comprises from about 0.1% to about 10% dissolved and/or suspended solids by weight.

27. The composition of claims 1-26, wherein the composition further comprises at least one surfactant.

28. The composition of claim 27, wherein the at least one surfactant comprises an anionic surfactant, cationic surfactant, zwitterionic surfactant, non-ionic surfactant or any combination thereof.

29. The composition of claim 1-28, further comprising a soil.

30. The composition of claim 29, wherein the soil comprises gravel, sand, silt, clay, or any combination thereof.

31. The composition of claims 29-30, wherein the composition comprises a maximum dry density (MDD) of at least about 1.5 gm/cc, such as from about 1.5 gm/cc to about 3 gm/cc.

32. A composition, comprising:

(a) at least one transesterified alkoxy silane; and

(b) soil.

33. The composition of claims 32, wherein the soil comprises gravel, sand, silt, clay, or any combination thereof.

34. The composition of claims 32-33, wherein the composition comprises a maximum dry density (MDD) of at least about 1.5 gm/cc, such as from about 1.5 gm/cc to about 3 gm/cc.

MARKED-UP CLAIMS

THAT WHICH IS CLAIMED:

1. A composition for soil stabilization, comprising:

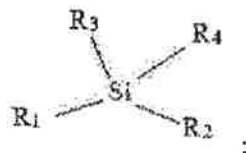
(a) at least one ionic organosilicon compound; and

(b) at least one water soluble non-ionic organosilane, wherein the at least one water soluble non-ionic organosilane comprises a transesterified alkoxy silane, an amino-functional silane, or a combination thereof;

wherein the composition comprises a liquid.

2. The composition of claim 1, wherein the at least one water soluble non-ionic organosilane comprises a transesterified alkoxy silane.

32. The composition of claims 1-2, wherein the transesterified alkoxy silane comprises a structure according to the formula:



wherein

R₁ comprises a substituted or non-substituted hydrocarbon radical;R₂ comprises a first hydroxy-containing alkoxy radical;R₃ comprises an alkoxy radical or a second hydroxy-containing alkoxy radical; andR₄ comprises an alkoxy radical or a third hydroxy-containing alkoxy radical.

43. The composition of claim 32, wherein the first hydroxy-containing alkoxy radical, the second hydroxy-containing alkoxy radical, and the third hydroxy-containing alkoxy radical are the same.

54. The composition of claim 32, wherein the first hydroxy-containing alkoxy radical is different than at least the second hydroxy-containing alkoxy radical.

65. The composition of claims 3-52-4, wherein R_1 comprises an alkyl radical.

76. The composition of claim 65, wherein the alkyl radical comprises a linear alkyl radical, a branched alkyl radical, or a cycloalkyl radical including from one to thirty carbon atoms,

87. The composition of claims 3-52-4, wherein R_1 comprises a substituted hydrocarbon radical having one or more of a halide atom, a nitrogen atom, or an oxygen atom.

98. The composition of claims 3-82-7, wherein at least the first hydroxy-containing alkoxy radical comprises $-(OCH_2CH_2)_aOH$ where 'a' has a value of 1 through 10, - $[OC_3H_6]_bOH$ where 'b' has a value of one through ten, or $[C_3H_7O_3]$.

109. The composition of claim 3-82-7, wherein the transesterified alkoxy silane comprises the first hydroxy-containing alkoxy radical and the second hydroxy-containing alkoxy radical, and wherein the first hydroxy-containing alkoxy radical and the second hydroxy-containing alkoxy radical each independently comprise $-(OCH_2CH_2)_aOH$ where 'a' has a value of 1 through 10, $-[OC_3H_6]_bOH$ where 'b' has a value of 1 through 10, or $[C_3H_7O_3]$.

~~1410~~. The composition of claim 1, wherein the at least one water soluble non-ionic organosilane comprises an inherently or naturally water soluble organosilane.

~~1411~~. The composition of claims 1-~~1410~~, wherein the at least one water soluble non-ionic organosilane comprises a solubility in water of at least about 2.5 grams per Liter of water at a temperature of 20°C, such as at least about any of the following: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, and 60 g/L and/or at most about 150, 140, 130, 120, 110, 100, 90, 80, 70, and 60 g/L.

~~1412~~. The composition of claims 1-~~1410-11~~, wherein the at least one water soluble non-ionic organosilane comprises an amino-functional silane or a bis-aminofunctional silane.

~~1413~~. The composition of claim ~~13~~claims 1-12, wherein the amino-functional silane comprises N-(2-aminoethyl)-3-aminopropyltrimethoxysilane, N-aminoethylaminomethyl)phenyltrimethoxysilane, N-(2-aminoethyl)-3-aminopropyltris(2-ethylhexoxy)-silane, 3-aminopropyltrimethoxysilane, trimethoxysilyl-propyldiethylenetriamine, bis(2-hydroxyethyl)-3-aminopropyltrimethoxysilane, 2-methacryloxyethyl dimethyl-[3-trimethoxysilylpropyl] ammonium chloride, or any combination thereof.

~~1514~~. The composition of claims 1-~~141-13~~, wherein the at least one water soluble non-ionic organosilane comprises a structure according to the following formula:



wherein, 'A' comprises a monovalent organic radical, 'Y' comprises a hydroxyl groups or a hydrolyzable radical, and n is 1, 2, or 3.

~~1615~~. The composition of claim ~~1514~~, wherein 'A' comprises an alkyl or aryl radical.

~~1716~~. The composition of claims ~~15-16~~14-15, wherein 'Y' comprises acetoxy radicals, alkoxy radicals with 1 to 6 carbon atoms.

~~1817~~. The composition of claims 1-~~17~~16, wherein the composition comprises at least one water soluble non-ionic organosilane comprising a transesterified alkoxy silane and at least one inherently or naturally water soluble non-ionic organosilane.

~~1918~~. The composition of claims 1-~~18~~17, wherein the composition is an aqueous solution or aqueous dispersion.

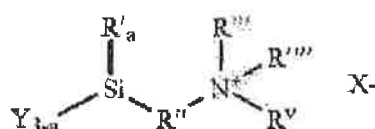
~~2019~~. The compositions of claims 1-~~19~~18, wherein the composition comprises less than 10% by weight, such less than 5% by weight, or less than 1% by weight of an organic solvent.

~~2120~~. The composition of claims 1-~~20~~19, wherein the composition is devoid of an organic solvent.

~~2221~~. The composition of claims 1-~~21~~20, wherein the composition comprises a weight ratio between the at least one water soluble non-ionic organosilane and the at least one ionic organosilicon compound comprising from about 98:2 to about 2:98; such as at most about any of the following: 95:5, 90:10, 85:15, 80:20, 75:25, 70:30, 65:45, 60:40, 55:45, 50:50, 45:55, and 40:60 and/or at least about any of the following: 2:98, 5:95, 10:90, 15:85, 20:80, 25:75, 30:70, 35:65, 40:60, 45:55, 50:50, 55:45, and 60:40.

2322. The composition of claims 1-2221, wherein the at least one ionic organosilicon compound comprises a cationic organosilicon compound.

2423. The composition of claim 2322, wherein the cationic organosilicon compound comprises a structure according to the formula:



wherein

Y is an alkoxy radical with 1 to 6 carbon atoms; 'a' has a value of zero; R' is propylene; R'' is methyl or ethyl; R''' and R^v are identical or different alkyl groups containing from one to twenty-two carbon atoms, wherein at least one of R''' and R^v is larger than eight carbon atoms; and X is a halide, acetate, or tosylate.

2524. The composition of claims 26-2822-23, wherein the cationic organosilicon compound comprises 3-(trimethoxysilyl)propyldimethyloctadecyl ammonium chloride, 3-(trimethoxysilyl)propylmethyldidecyl ammonium chloride, or 3-(trimethoxysilyl)propyldimethylhexadecyl ammonium chloride.

2625. The composition of claims 1-2524, wherein the sum of the at least one ionic organosilicon compound and the at least one water soluble non-ionic organosilane comprises from about 5% to about 100% dissolved and/or suspended solids by weight.

2726. The composition of claims 1-2524, wherein the sum of the at least one ionic organosilicon compound and the at least one water soluble non-ionic organosilane comprises from about 0.1% to about 10% dissolved and/or suspended solids by weight.

~~2827~~. The composition of claims ~~1-2726~~, wherein the composition further comprises at least one surfactant.

~~2928~~. The composition of claim ~~2827~~, wherein the at least one surfactant comprises an anionic surfactant, cationic surfactant, zwitterionic surfactant, non-ionic surfactant or any combination thereof.

~~3029~~. The composition of claim ~~1-2928~~, further comprising a soil.

~~3130~~. The composition of claim ~~3029~~, wherein the soil comprises gravel, sand, silt, clay, or any combination thereof.

~~3231~~. The composition of claims ~~30-3129-30~~, wherein the composition comprises a maximum dry density (MDD) of at least about 1.5 gm/cc, such as from about 1.5 gm/cc to about 3 gm/cc.

~~3332~~. A composition, comprising:

- (a) at least one transesterified alkoxy silane; and
- (b) soil.

~~3433~~. The composition of claims ~~3332~~, wherein the soil comprises gravel, sand, silt, clay, or any combination thereof.

3534. The composition of claims 33-3432-33, wherein the composition comprises a maximum dry density (MDD) of at least about 1.5 gm/cc, such as from about 1.5 gm/cc to about 3 gm/cc.