THAT WHICH IS CLAIMED:

1. A method for neutralizing a broad spectrum of toxic industrial chemicals and materials, the method comprising the steps of:

applying a composition having an active ingredient to a toxic industrial chemical or material to thereby neutralize said toxic industrial chemical or and material, wherein the active ingredient comprises one or more of 2,3, butanedione monoxime, an alkali or alkaline salt thereof, or a derivative thereof.

2. The method of claim 1, wherein the toxic industrial material is an acid or an agent including a moiety that is susceptible to nucleophilic attack by a nucleophilic carbonyl atom or a nucleophilic oxime nitrogen atom or an oxygen atom.

3. The method of claim 2, wherein the toxic industrial chemical or material is selected from the group consisting of 1,1'-bi(ethylene oxide), acrylonitriles, allyl alcohols, allyl chlorides, methyl mercaptan, and phosgene.

4. The method of claim 1, wherein the toxic chemical or material is an acid.

5. The method of claim 3, wherein the acid is selected from the group consisting of sulfuric acid (H_2SO_4), hydrochloric acid (HCl), hydrofluoric acid (HF), perchloric acid (HClO4), hydrobromic acid (HBr), hydroiodic acid (HI), nitric acid (HNO_3), nitrous acid (HNO_2), acetic acid, arsine (AsH_3), hydrogen selenide, hydrogen sulfide (H_2S), acid byproducts of nitrogen dioxide (NO_2), sulfur dioxide (SO_2), phosphoric acids, acetic anhydride, maleic anhydride, mixed anhydries, fluoroacetic aceid, and chloroacetic acid.

6. The method of claim 1, wherein the active ingredient is dispersed in a carrier that is selected from the group consisting of polyethylene glycol, monomethoxypolyethylene glycol, and polyethylene glycol ether.

7. The method of claim 6, wherein the toxic industrial chemical or material is selected from the group consisting of hydrazine, chlorine, and ammonia.

8. The method of claim 1, wherein the composition containing the active ingredient is applied in an amount ranging from about 1:1 to 20:1 based on the amount of toxic industrial chemical or material.

9. The method of claim 1, wherein the active ingredient is selected from the group consisting of 2,3 pentandione monoxime, 3,4 pentandione monoxime, 3,4 hexanone monoxime, 2,3 hexananone monoxime and 4,5 hexanone monoxime (alternate names may include 2,3- pentanedione 3-oxime (CAS 609-29-0) 2 oximo pentane-3-one, 3, oximo pentane -4-one, 2,3-Pentanedione, 3-oxime, 2,4-Pentanedione oxime, Pentane-2,3-dione 2-oxime, 2,3,4-Pentanetrione, 3-oxime, 2,4-Pentanedione, dioxime, 2,4-Pentanedione, 2,4-dioxime, and combinations thereof.

10. The method of claim 1, wherein the step of neutralizing said toxic industrial chemical or and material comprise sequestering said toxic industrial chemical or and material.

11. A method for neutralizing metal atoms, the method comprising the steps of:

reacting a composition having an active ingredient having at least one nucleophilic carbonyl moeity and at least one nucleophilic oxime nitrogen moiety with a metal; and

chelating the metal to form a ring structure in which the at least one nucleophilic carbonyl moiety and at least one nucleophilic oxime nitrogen moiety are bonded to the metal.

12. The method of claim 11, wherein the active ingredient comprises 2,3, butanedione monoxime or an alkali or alkaline salt thereof.

13. The method of claim 11, wherein the active ingredient comprises potassium 2,3, butanedione monoxime.

14. The method of claim 11, wherein the metal is selected from the group consisting of heavy metals, lead, transition metals, radioactive metals, Pu, Th, U, Zr, Nb, Ru, actinides, lanthanides, rare earth metals, and combination thereof.

15. The method of claim 11, wherein the ring has 5 to 7 sides.

16. The method of claim 11, wherein the active ingredient is selected from the group consisting of 2,3 pentandione monoxime, 3,4 pentandione monoxime, 3,4 hexanone

monoxime, 2,3 hexananone monoxime and 4,5 hexanone monoxime (alternate names may include 2,3- pentanedione 3-oxime (CAS 609-29-0) 2 oximo pentane-3-one, 3, oximo pentane -4-one, 2,3-Pentanedione, 3-oxime, 2,4-Pentanedione oxime, Pentane-2,3-dione 2-oxime, 2,3,4-Pentanetrione, 3-oxime, 2,4-Pentanedione, dioxime, and 2,4-Pentanedione, 2,4-dioxime, and combinations thereof.

17. The method of claim 11, wherein the composition containing the active ingredient is applied in an amount ranging from about 1:1 to 20:1 based on the amount of metal.

18. The method of claim 11, wherein the active ingredient comprises 2,3, butanedione monoxime, and further comprising the steps of:

reacting the metal with a first and second molecule of 2,3, butanedione monoxime to form a chelated metal having a square planar complex.

19. The method of claim 11, wherein the composition is applied to the skin of a person in need thereof.

20. A method of neutralizing a broad spectrum of pesticides, the method comprising:

reacting a composition having an active ingredient with a pesticide to thereby neutralize said pesticide, wherein the active ingredient comprises 2,3, butanedione monoxime or an alkali salt thereof, and wherein the pesticide is selected from the group consisting of organophosphates, carbamates, organochlorine, and pyrethroids.

21. The method of claim 20, wherein the pesticide includes a carbamate selected from the group consisting of 2-methyl-2-(methylthio)propionaldehyde O-methylcarbamoyloxime, 2,3-dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate, 3-hydroxycarbofuran; ethyl N-[2-(4-phenoxyphenoxy)ethyl]carbamate, 1-naphthyl methylcarbamate, ethienocarb, 3- hydroxycarbofuran, aldicarb sulfone, aldicarb sulfoxide, butylate, S-ethyl dipropylthiocarbamate, methiocarb, methomyl, molinate, oxamyl, pebulate, propham, propoxur, thiobencarb, triallate, and 2-(1-methylpropyl)phenyl N-methylcarbamate.

22. The method of claim 20, wherein the composition is applied to the skin of a person in need thereof.

23. The method of claim 20, wherein the composition is a cream, a gel, or a lotion.

24. The method of claim 20, wherein the active ingredient is dispersed in a carrier and wherein the method further comprises reacting the carrier with the pesticide to thereby sequester the pesticide.

CLAIMS

1. A method for neutralizing metal atoms, the method comprising the steps of:

reacting a composition having an active ingredient having at least one nucleophilic carbonyl moiety and at least one nucleophilic oxime nitrogen moiety with a metal; and

chelating the metal to form a ring structure in which the at least one nucleophilic carbonyl moiety and at least one nucleophilic oxime nitrogen moiety are bonded to the metal; and

wherein the metal is selected from the group consisting of lead, radioactive metals, Pu, Th, U, Zr, Nb, Ru, actinides, lanthanides, rare earth metals, and combination thereof, and

wherein the composition is used to decontaminate a surface after exposure to the metal atoms.

2. The method of claim 1, wherein the active ingredient comprises 2,3, butanedione monoxime or an alkali or alkaline salt thereof.

3. The method of claim 1, wherein the active ingredient comprises potassium 2,3, butanedione monoxime.

4. The method of any one of claims 1 to 3, wherein the ring has 5 to 7 sides.

5. The method of any one of claims 1 to 4, wherein the composition containing the active ingredient is applied in an amount ranging from about 1:1 to 20:1 based on the amount of metal.

6. The method of claim 1, wherein the active ingredient is selected from the group consisting of 2,3 pentandione monoxime, 3,4 pentandione monoxime, 3,4 hexanone monoxime, 2,3 hexananone monoxime and 4,5 hexanone monoxime (alternate names may include 2,3-pentanedione 3-oxime (CAS 609-29-0) 2 oximo pentane-3-one, 3, oximo pentane -4-one, 2,3-Pentanedione, 3-oxime, 2,4-Pentanedione oxime, Pentane-2,3-dione 2-oxime, 2,3,4-Pentanetrione, 3-oxime, 2,4-Pentanedione, dioxime, and 2,4-Pentanedione, 2,4-dioxime, and combinations thereof.

7. The method of any one of claims 1 to 5, wherein the active ingredient comprises 2,3, butanedione monoxime, and further comprising the step of:

reacting the metal with a first and second molecule of 2,3,butanedione monoxime to form a chelated metal having a square planar complex.

8. The method of any one of claims 1 to 7, further comprising the step of removing any residual from the surface.

9. The method of any one of claims 1 to 8, wherein the composition is applied to a metal, stone or plastic surface.

10. A method for neutralizing metal atoms, the method comprising the steps of:

reacting a composition comprising 2,3,butanedione monoxime or an alkali salt thereof with a metal; and

chelating the metal to form a ring structure in which the carbonyl moiety and the at least one nucleophilic oxime nitrogen moiety of the 2,3,butanedione monoxime or an alkali salt thereof are bonded to the metal;

wherein the composition is used as a topical skin protectant to be applied to human skin prior to or after exposure to the metal atoms.

11. The method of claim 10, wherein the composition is applied to the skin of a person in need thereof.

12. The method of claim 10 or claim 11, wherein the active ingredient comprises potassium 2,3, butanedionemonoxime.

13. The method of any one of claims 10 to 12, wherein the ring has 5 to 7 sides.

14. The method of any one of claims 10 to13, wherein the composition containing the active ingredient is applied in an amount ranging from about 1:1 to 20:1 based on the amount of metal.

15. The method of claim 10, further comprising the step of:

reacting the metal with a first and second molecule of 2,3,butanedionemonoxime to form a chelated metal having a square planar complex.

16. The method of any one of claims 10 to 15, wherein the composition further comprises a carrier in which 2,3,butanedione monoxime or an alkali salt thereof is dispersed.

17. The method of claim 16, wherein the carrier is selected from the group consisting of polyethylene glycol (PEG), monomethoxypolyethylene glycol (mPEG) and combinations thereof.

18. The method of claim 17, wherein the carrier is mPEG.

19. The method of any one of claims 10 to 18, wherein the composition is a cream, a gel, or a lotion.

20. The method of any one of claims 10 to 19, further comprising removing any residual from the human skin.

21. The method of any one of claims 10 to 20, wherein the metal is selected from the group consisting of lead, radioactive metals, Pu, Th, U, Zr, Nb, Ru, actinides, lanthanides, rare earth metals, and combination thereof.