# THE CLAIMS

What is claimed is:

1. An aqueous cleaning composition, comprising at least one etchant, water, optionally at least one low-k passivating agent, optionally at least one surfactant, and optionally a source of silica, wherein the composition is further characterized by including components (I), (II) or (III):

(I) at least one chelating agent, optionally at least one organic solvent, and optionally at least one corrosion inhibitor;

(II) at least one metal corrosion inhibitor, optionally at least one organic solvent, and optionally at least one metal chelating agent; or

(III) at least one organic solvent, optionally at least one chelating agent, and optionally at least one corrosion inhibitor,

wherein said aqueous cleaning composition is suitable for cleaning post-plasma etch residue from a microelectronic device having said residue thereon.

2. A cleaning composition comprising at least one organic solvent, at least one metal-chelating agent, optionally at least one surfactant, optionally at least one corrosion inhibitor, optionally at least one low-k passivating agent, optionally at least one etchant, and optionally water, wherein said cleaning composition is suitable for cleaning post-plasma etch residue from a microelectronic device having said residue thereon.

3. The cleaning composition as in any of claims 1-2, wherein the post-plasma etch residue comprises residue selected from the group consisting of titanium-containing compounds, polymeric compounds, copper-containing compounds, tungsten-containing compounds, cobalt-containing compounds, and combinations thereof.

4. The cleaning composition as in any of claims 1-2, wherein the at least one etchant comprises a fluoride species selected from the group consisting of hydrofluoric acid, fluorosilicic acid, fluoroboric acid, tetramethylammonium hexafluorophosphate, ammonium fluoride salts, ammonium bifluoride salts, ammonium fluorosilicate, tetrabutylammonium tetrafluoroborate, propylene glycol/HF, propylene glycol/tetraalkylammonium fluoride, propylene glycol/benzyltrimethylammonium fluoride, and combinations thereof.

5. The cleaning composition as in any of claims 1-2, wherein the at least one organic solvent comprises a species selected from the group consisting of alcohols, ethers, pyrrolidinones, amines, glycols, glycol ethers, and combinations thereof.

6. The cleaning composition as in any of claims 1-2, wherein the at least one organic solvent comprises a sub-species selected from the group consisting of methanol, ethanol, isopropanol, diols, 3-chloro-1,2-propanediol, triols, 3-chloro-1-propanethiol, 1-chloro-2-propanol, 2-chloro-1-propanol, 3-chloro-1-propanol, 3-bromo-1,2-propanediol, 1-bromo-2-propanol, 3-bromo-1-propanol, 3-iodo-1-propanol, 4-chloro-1-butanol, 2-chloroethanol, dichloromethane, chloroform, acetic acid, propionic acid, trifluoroacetic acid, tetrahydrofuran (THF), N-methylpyrrolidinone (NMP), cyclohexylpyrrolidinone, N-octylpyrrolidinone, N-phenylpyrrolidinone, methyldiethanolamine, methyl formate, dimethyl formamide (DMF), dimethylsulfoxide (DMSO), tetramethylene sulfone (sulfolane), diethyl ether, phenoxy-2-propanol (PPh), propriophenone, ethyl lactate, ethyl acetate, ethyl benzoate, acetonitrile, acetone, ethylene glycol, propylene glycol, 1,3-propanediol, 1,4-propanediol, dioxane, butyryl lactone, butylene carbonate, ethylene carbonate, propylene carbonate, dipropylene glycol, diethylene glycol monomethyl ether, triethylene glycol monomethyl ether, diethylene glycol monoethyl ether, triethylene glycol monoethyl ether, ethylene glycol monopropyl ether, ethylene glycol monobutyl ether, diethylene glycol monobutyl ether, triethylene glycol monobutyl ether, ethylene glycol monohexyl ether, diethylene glycol monohexyl ether, ethylene glycol phenyl ether, propylene glycol methyl ether, dipropylene glycol methyl ether, tripropylene glycol methyl ether, dipropylene glycol dimethyl ether, dipropylene glycol ethyl ether,

propylene glycol n-propyl ether, dipropylene glycol n-propyl ether (DPGPE), tripropylene glycol n-propyl ether, propylene glycol n-butyl ether, dipropylene glycol n-butyl ether, tripropylene glycol n-butyl ether, propylene glycol phenyl ether, gamma-butyrolactone, and combinations thereof.

7. The cleaning composition of claims 1-2, wherein the at least one chelating agent comprises a species selected from the group consisting of 1,1,1,5,5,5-hexafluoro-2,4-pentanedione (hfacH), 1,1,1-trifluoro-2,4-pentanedione (tfac), and acetylacetonate (acac), iminodiacetic acid, pyrazolates, amidinates, guanidinates, ketoimines, dienes, polyamines, ethylenediaminetetraacetic acid (EDTA), 1,2-cyclohexanediamine-N,N,N′,N′-tetraacetic acid (CDTA), etidronic acid, methanesulfonic acid, hydrochloric acid, acetic acid, alkylamines, arylamines, glycolamines, alkanolamines, triazoles, thiazoles, tetrazoles, imidazoles, 1,4-benzoquinone; 8-hydroxyquinoline; salicylidene aniline; tetrachloro-1,4-benzoquinone; 2-(2-hydroxyphenyl)-benzoxazol; 2-(2-hydroxyphenyl)-benzothiazole; hydroxyquinoline sulfonic acid (HQSA); sulfosalicylic acid (SSA); salicylic acid (SA), tetramethylammonium fluoride, tetramethylammonium chloride, tetramethylammonium bromide, tetramethylammonium iodide, pyridine, 2-ethylpyridine, 2-methoxypyridine, 3-methoxypyridine, 2-picoline, pyridine derivatives, dimethylpyridine, piperidine, piperazine, triethylamine, triethanolamine, ethylamine, methylamine, isobutylamine, tert-butylamine, tributylamine, dipropylamine, dimethylamine, diglycol amine, monoethanolamine, methyldiethanolamine, pyrrole, isoxazole, 1,2,4-triazole, bipyridine, pyrimidine, pyrazine, pyridazine, quinoline, isoquinoline, indole, imidazole, N-methylmorpholine-N-oxide (NMMO), trimethylamine-N-oxide, triethylamine-N-oxide, pyridine-N-oxide, N-ethylmorpholine-N-oxide, N-methylpyrrolidine-N-oxide, N-ethylpyrrolidine-N-oxide, 1-methylimidazole, diisopropylamine, diisobutylamine, aniline, aniline derivatives, pentamethyldiethylenetriamine, and combinations thereof.

8. The cleaning composition of claim 1, wherein the at least one metal corrosion inhibitor comprises a species selected from the group consisting of benzotriazole (BTA), 1,2,4-triazole (TAZ), 5-aminotetrazole (ATA), 1-hydroxybenzotriazole, 5-amino-1,3,4-

thiadiazol-2-thiol, 3-amino-1H-1,2,4 triazole, 3,5-diamino-1,2,4-triazole, tolyltriazole, 5-phenyl-benzotriazole, 5-nitro-benzotriazole, 3-amino-5-mercapto-1,2,4-triazole, 1-amino-1,2,4-triazole, 2-(5-amino-pentyl)-benzotriazole, 1-amino-1,2,3-triazole, 1-amino-5-methyl-1,2,3-triazole, 3-mercapto-1,2,4-triazole, 3-isopropyl-1,2,4-triazole, 5-phenylthiol-benzotriazole, halo-benzotriazoles (halo = F, Cl, Br, I), naphthotriazole, 1H-tetrazole-5-acetic acid, 2-mercaptobenzothiazole (2-MBT), 1-phenyl-2-tetrazoline-5-thione, 2-mercaptobenzimidazole (2-MBI), 4-methyl-2-phenylimidazole, 2-mercaptothiazoline, 2,4-diamino-6-methyl-1,3,5-triazine, thiazole, imidazole, benzimidazole, triazine, methyltetrazole, Bismuthiol I, 1,3-dimethyl-2-imidazolidinone, 1,5-pentamethylenetetrazole, 1-phenyl-5-mercaptotetrazole, diaminomethyltriazine, imidazoline thione, 4-methyl-4H-1,2,4-triazole-3-thiol, 5-amino-1,3,4-thiadiazole-2-thiol, benzothiazole, tritolyl phosphate, indazole, adenine, cytosine, guanine, thymine, phosphate inhibitors, amines, pyrazoles, propanethiol, silanes, secondary amines, benzohydroxamic acids, heterocyclic nitrogen inhibitors, citric acid, ascorbic acid, thiourea, 1,1,3,3-tetramethylurea, urea, urea derivatives, uric acid, potassium ethylxanthate, glycine, iminodiacetic acid, acid, boric acid, malonic acid, succinic acid, nitrilotriacetic acid, sulfolane, 2,3,5-trimethylpyrazine, 2-ethyl-3,5-dimethylpyrazine, quinoxaline, acetyl pyrrole, pyridazine, histadine, pyrazine, glutathione (reduced), cysteine, cystine, thiophene, mercapto pyridine N-oxide, thiamine HCl, tetraethyl thiuram disulfide, 2,5-dimercapto-1,3-thiadiazoleascorbic acid, ascorbic acid, and combinations thereof.

9. The cleaning composition of claim 1, comprising a source of silica, wherein the source of silica comprises TEOS.

10. The cleaning composition as in any of claims 1-2, wherein said composition further comprises post-plasma etch residue selected from the group consisting of titanium-containing residue, polymeric-residue, copper-containing residue, tungsten-containing residue, cobalt-containing residue, and combinations thereof.

11. The cleaning composition of claim 1, comprising at least one organic solvent, at least one etchant, at least one chelating agent, a source of silica, at least one corrosion inhibitor and

water, wherein the weight percent ratios of the organic solvent(s) relative to etchant(s) is about 5 to about 8, the water relative to etchant(s) is about 85 to about 91, the source of silica relative to etchant(s) is about 0.1 to about 0.5, the chelating agent(s) relative to etchant(s) is about 0.5 to about 2.5, and the corrosion inhibitor(s) relative to etchant(s) is about 1 to about 4.

12. The cleaning composition of claim 1, comprising at least one organic solvent, at least one etchant, a source of silica, at least one corrosion inhibitor, and water, wherein the weight percent ratios of the organic solvent(s) relative to etchant(s) is about 3 to about 7, the water relative to etchant(s) is about 88 to about 93, the source of silica relative to etchant(s) is about 0.1 to about 0.5, and the corrosion inhibitor(s) relative to etchant(s) is about 1 to about 4.

13. The cleaning composition of claim 1, comprising at least one organic solvent, at least one etchant, at least one corrosion inhibitor, and water, wherein the weight percent ratios of the organic solvent(s) relative to the etchant(s) is about 60 to about 90, the water relative to etchant(s) is about 2 to about 30, and the corrosion inhibitor(s) relative to etchant(s) is about 0.01 to about 0.5.

14. The cleaning composition of claims 1, 11, 12 or 13, wherein the pH is in a range from about 0 to about 5.

15. The cleaning composition of claim 2, further comprising at least one corrosion inhibitor, at least one low-k passivating agent, and water.

16. The cleaning composition of claim 2, further comprising at least one etchant.

17. The cleaning composition of claim 2, further comprising at least one corrosion inhibitor and at least one etchant.

18. The cleaning composition of claim 2, comprising pentamethyldiethylenetriamine, propylene glycol, gamma-butyrolactone, and propylene glycol/HF.

19. The cleaning composition of claim 17, comprising pentamethyldiethylenetriamine, propylene glycol, gamma-butyrolactone, propylene glycol/HF, and benzotriazole.

20. A kit comprising, in one or more containers, one or more of the following reagents for forming an aqueous cleaning composition, said one or more reagents selected from the group consisting of at least one etchant, water, optionally at least one low-k passivating agent, optionally at least one surfactant, and optionally a source of silica, wherein the composition is further characterized by including components (I), (II) or (III):

(I) at least one chelating agent, optionally at least one organic solvent, and optionally at least one corrosion inhibitor;

(II) at least one metal corrosion inhibitor, optionally at least one organic solvent, and optionally at least one metal chelating agent; or

(III) at least one organic solvent, optionally at least one chelating agent, and optionally at least one corrosion inhibitor,

and wherein the kit is adapted to form an aqueous cleaning composition suitable for cleaning post-plasma etch residue from a microelectronic device having said residue thereon.

21. A kit comprising, in one or more containers, one or more of the following reagents for forming a cleaning composition, said one or more reagents selected from the group consisting of at least one organic solvent, at least one metal-chelating agent, optionally at least one surfactant, optionally at least one corrosion inhibitor, optionally at least one low-k passivating agent, optionally at least one etchant, and optionally water, and wherein the kit is adapted to form a cleaning composition suitable for cleaning post-plasma etch residue from a microelectronic device having said residue thereon.

22. A method of removing material from a microelectronic device having said material thereon, said method comprising contacting the microelectronic device with an aqueous cleaning composition for sufficient time to at least partially remove said material from

the microelectronic device, wherein the aqueous cleaning composition includes at least one etchant, water, optionally at least one low-k passivating agent, optionally at least one surfactant, and optionally a source of silica, wherein the composition is further characterized by including components (I), (II) or (III):

(I) at least one chelating agent, optionally at least one organic solvent, and optionally at least one corrosion inhibitor;

(II) at least one metal corrosion inhibitor, optionally at least one organic solvent, and optionally at least one metal chelating agent; or

(III) at least one organic solvent, optionally at least one chelating agent, and optionally at least one corrosion inhibitor.

23. A method of removing post-plasma etch residue from a microelectronic device having said residue thereon, said method comprising contacting the microelectronic device with a cleaning composition for sufficient time to at least partially remove said residue from the microelectronic device, wherein the cleaning composition includes at least one organic solvent, at least one metal-chelating agent, optionally at least one surfactant, optionally at least one corrosion inhibitor, optionally at least one low-k passivating agent, optionally at least one etchant, and optionally water.

24. The method of claim 22, wherein the material comprise post-plasma etch residue, TiN, or combinations thereof.

25. The method as in any of claims 23 or 24, wherein said post-plasma etch residue comprises residue selected from the group consisting of titanium-containing compounds, polymeric compounds, copper-containing compounds, tungsten-containing compounds, cobalt-containing compounds, and combinations thereof.

26. The method as in any of claims 22-23, wherein said contacting comprises conditions selected from the group consisting of: time of from about 1 minute to about 30 minutes; temperature in a range of from about 40°C to about 70°C; and combinations thereof.

27. The method as in any of claims 22-23, wherein the microelectronic device is of an article selected from the group consisting of semiconductor substrates, flat panel displays, and microelectromechanical systems (MEMS).

28. The method as in any of claims 22-23, wherein the microelectronic device comprises an ultra low-k dielectric layer.

29. The method as in any of claims 22-23, wherein the contacting comprises a process selected from the group consisting of: spraying the composition on a surface of the microelectronic device; dipping the microelectronic device in a sufficient volume of composition; contacting a surface of the microelectronic device with another material that is saturated with the composition; and contacting the microelectronic device with a circulating composition.

30. The method as in any of claims 22-23, further comprising rinsing the microelectronic device with deionized water following contact with the composition.

31. The method as in any of claims 22-23, wherein said composition further comprises post-plasma etch residue selected from the group consisting of titanium-containing residue, polymeric-residue, copper-containing residue, tungsten-containing residue, cobalt-containing residue, and combinations thereof.

32. The method as in any of claims 22-23, further comprising a post-bake step to remove non-volatile materials from the microelectronic device.

33. The method as in any of claims 22-23, further comprising an isopropanol vapor-dry step to remove non-volatile materials from the microelectronic device.

CLAIMS

1. An aqueous cleaning composition, comprising at least one etchant, water, at least one low-k passivating agent, at least one organic solvent, and at least one metal corrosion inhibitor,

wherein the at least one etchant comprises a fluoride species selected from the group consisting of hydrofluoric acid, fluorosilicic acid, ammonium fluoride, ammonium bifluoride, ammonium fluorosilicate, propylene glycol in combination with HF, and combinations thereof, and

wherein said aqueous cleaning composition is suitable for cleaning post-plasma etch residue from a microelectronic device having said residue thereon.

2. The cleaning composition of claim 1, wherein the post-plasma etch residue comprises residue selected from the group consisting of titanium-containing compounds, polymeric compounds, copper-containing compounds, tungsten-containing compounds, cobalt-containing compounds, and combinations thereof.

3. The cleaning composition of claim 1 or 2, wherein the at least one low-k passivating agent comprises a species selected from the group comprising boric acid, iminodiacetic acid, 3-hydroxy-2-naphthoic acid, malonic acid, and combinations thereof.

4. The cleaning composition of claim 1 or 2, wherein the at least one organic solvent comprises a species selected from the group consisting of alcohols, ethers, pyrrolidinones, amines, glycols, glycol ethers, and combinations thereof.

5. The cleaning composition of claim 1 or 2, wherein the at least one organic solvent comprises a sub-species selected from the group consisting of methanol, ethanol, isopropanol, diols, 3-chloro-1,2-propanediol, triols, 3-chloro-1-propanethiol, 1-chloro-2-propanol, 2-chloro-1-propanol, 3-chloro-1-propanol, 3-bromo-1,2-propanediol, 1-bromo-2-propanol, 3-bromo-1-propanol, 3-iodo-1-propanol, 4-chloro-1-butanol, 2-chloroethanol, dichloromethane, chloroform, acetic acid, propionic acid, trifluoroacetic acid, tetrahydrofuran (THF), N-methylpyrrolidinone (NMP), cyclohexylpyrrolidinone, N-octylpyrrolidinone, N-phenylpyrrolidinone, methyldiethanolamine, methyl formate, dimethyl formamide (DMF), dimethylsulfoxide (DMSO), tetramethylene sulfone (sulfolane), diethyl ether, phenoxy-2-propanol (PPh), propriophenone, ethyl lactate, ethyl acetate, ethyl benzoate, acetonitrile, acetone, ethylene glycol, propylene glycol, 1,3-propanediol, 1,4-propanediol, dioxane, butyryl lactone, butylene carbonate, ethylene carbonate, propylene carbonate, dipropylene glycol, diethylene glycol monomethyl ether, triethylene glycol monomethyl ether, diethylene glycol monoethyl ether, triethylene glycol monoethyl ether, ethylene glycol monopropyl ether, ethylene glycol monobutyl ether, diethylene glycol monobutyl ether,

triethylene glycol monobutyl ether, ethylene glycol monohexyl ether, diethylene glycol monohexyl ether, ethylene glycol phenyl ether, propylene glycol methyl ether, dipropylene glycol methyl ether, tripropylene glycol methyl ether, dipropylene glycol dimethyl ether, dipropylene glycol ethyl ether, propylene glycol n-propyl ether, dipropylene glycol n-propyl ether (DPGPE), tripropylene glycol n-propyl ether, propylene glycol n-butyl ether, dipropylene glycol n-butyl ether, tripropylene glycol n-butyl ether, propylene glycol phenyl ether, gamma-butyrolactone, and combinations thereof.

6. The cleaning composition of claim 1 or 2, further comprising at least one chelating agent, wherein the at least one chelating agent comprises a species selected from the group consisting of 1,1,1,5,5,5-hexafluoro-2,4-pentanedione (hfacH), 1,1,1-trifluoro-2,4-pentanedione (tfac) and acetylacetonate (acac), iminodiacetic acid, pyrazolates, amidinates, guanidinates, ketoimines, dienes, polyamines, ethylenediaminetetraacetic acid (EDTA), 1,2-cyclohexanediamine-N,N,N′,N′-tetraacetic acid (CDTA), etidronic acid, methanesulfonic acid, hydrochloric acid, acetic acid, alkylamines, arylamines, glycolamines, alkanolamines, triazoles, thiazoles, tetrazoles, imidazoles, 1,4-benzoquinone; 8-hydroxyquinoline; salicylidene aniline; tetrachloro-1,4-benzoquinone; 2-(2-hydroxyphenyl)-benzoxazol; 2-(2-hydroxyphenyl)-benzothiazole; hydroxyquinoline sulfonic acid (HQSA); sulfosalicylic acid (SSA); salicylic acid (SA), tetramethylammonium fluoride, tetramethylammonium chloride, tetramethylammonium bromide, tetramethylammonium iodide, pyridine, 2-ethylpyridine, 2-methoxypyridine, 3-methoxypyridine, 2-picoline, pyridine derivatives, dimethylpyridine, piperidine, piperazine, triethylamine, triethanolamine, ethylamine, methylamine, isobutylamine, tert-butylamine, tributylamine, dipropylamine, dimethylamine, diglycol amine, monoethanolamine, methyldiethanolamine, pyrrole, isoxazole, 1,2,4-triazole, bipyridine, pyrimidine, pyrazine, pyridazine, quinoline, isoquinoline, indole, imidazole, N-methylmorpholine-N-oxide (NMMO), trimethylamine-N-oxide, triethylamine-N-oxide, pyridine-N-oxide, N-ethylmorpholine-N-oxide, N-methylpyrrolidine-N-oxide, N-ethylpyrrolidine-N-oxide, 1-methylimidazole, diisopropylamine, diisobutylamine, aniline, aniline derivatives, pentamethyldiethylenetriamine, and combinations thereof.

7. The cleaning composition of claim 1 or 2, wherein the at least one metal corrosion inhibitor comprises a species selected from the group consisting of benzotriazole (BTA), 1,2,4-triazole (TAZ), 5-aminotetrazole (ATA), 1-hydroxybenzotriazole, 5-amino-1,3,4-thiadiazol-2-thiol, 3-amino-1H-1,2,4 triazole, 3,5-diamino-1,2,4-triazole, tolyltriazole, 5-phenyl-benzotriazole, 5-nitro-benzotriazole, 3-amino-5-mercapto-1,2,4-triazole, 1-amino-1,2,4-triazole, 2-(5-amino-pentyl)-benzotriazole, 1-amino-1,2,3-triazole, 1-amino-5-methyl-1,2,3-triazole, 3-mercapto-1,2,4-triazole, 3-isopropyl-1,2,4-triazole, 5-phenylthiol-benzotriazole, halo-benzotriazoles, naphthotriazole, 1H-tetrazole-5-acetic acid, 2-mercaptobenzothiazole (2-MBT), 1-phenyl-2-tetrazoline-5-thione, 2-mercaptobenzimidazole (2-MBI), 4-methyl-2-phenylimidazole, 2-mercaptothiazoline, 2,4-diamino-

6-methyl-1,3,5-triazine, thiazole, imidazole, benzimidazole, triazine, methyltetrazole, Bismuthiol I, 1,3-dimethyl-2-imidazolidinone, 1,5-pentamethylenetetrazole, 1-phenyl-5-mercaptotetrazole, diaminomethyltriazine, imidazoline thione, 4-methyl-4H-1,2,4-triazole-3-thiol, 5-amino-1,3,4-thiadiazole-2-thiol, benzothiazole, tritolyl phosphate, indazole, adenine, cytosine, guanine, thymine, phosphate inhibitors, amines, pyrazoles, propanethiol, silanes, secondary amines, benzohydroxamic acids, heterocyclic nitrogen inhibitors, citric acid, ascorbic acid, thiourea, 1,1,3,3-tetramethylurea, urea, urea derivatives, uric acid, potassium ethylxanthate, glycine, iminodiacetic acid, acid, boric acid, malonic acid, succinic acid, nitrilotriacetic acid, sulfolane, 2,3,5-trimethylpyrazine, 2-ethyl-3,5-dimethylpyrazine, quinoxaline, acetyl pyrrole, pyridazine, histadine, pyrazine, reduced glutathione, cysteine, cystine, thiophene, mercapto pyridine N-oxide, thiamine HCl, tetraethyl thiuram disulfide, 2,5-dimercapto-1,3-thiadiazoleascorbic acid, ascorbic acid, and combinations thereof.

8. The cleaning composition of claim 1 or 2, further comprising a source of silica, wherein the source of silica comprises TEOS.

9. The cleaning composition of claim 1 or 2, wherein said composition further comprises post-plasma etch residue selected from the group consisting of titanium-containing residue, polymeric-residue, copper-containing residue, tungsten-containing residue, cobalt-containing residue, and combinations thereof.

10. The cleaning composition of claim 1 or 2, wherein the pH is in a range from 0 to 5.

11. A method of removing material from a microelectronic device having said material thereon, said method comprising contacting the microelectronic device with an aqueous cleaning composition for sufficient time to at least partially remove said material from the microelectronic device,

wherein the aqueous cleaning composition comprises at least one etchant, water, at least one low-k passivating agent, at least one organic solvent, and at least one metal corrosion inhibitor, wherein the at least one etchant comprises a fluoride species selected from the group consisting of hydrofluoric acid, fluorosilicic acid, ammonium fluoride, ammonium bifluoride, ammonium fluorosilicate, propylene glycol in combination with HF, and combinations thereof.

12. The method of claim 11, wherein the material comprise post-plasma etch residue, TiN, or combinations thereof.

13. The method of claim 11 or 12, wherein said post-plasma etch residue comprises residue selected from the group consisting of titanium-containing compounds, polymeric compounds, copper-containing compounds, tungsten-containing compounds, cobalt-containing compounds, and combinations thereof.

14. The method of claim 11 or 12, wherein said contacting comprises conditions selected from the group consisting of: time of from 1 minute to 30 minutes; temperature in a range of from 40°C to 70°C; and combinations thereof.

15. The method of claim 11 or 12, wherein the contacting comprises a process selected from the group consisting of: spraying the composition on a surface of the microelectronic device; dipping the microelectronic device in a static or dynamic volume of composition; and contacting a surface of the microelectronic device with a pad that is saturated with the composition.

16. The method of claim 11 or 12, further comprising rinsing the microelectronic device with deionized water following contact with the composition.