CLAIMS

What is claimed is

1. A composition for cleaning microelectronic devices or semiconductor substrates comprising:

(i) at least one alkanolamine;

(ii) at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof;

(iii) at least one polyfunctional organic acid with at least two carboxylic acid groups; and

(iv) water.

~~**2.** A composition for cleaning microelectronic devices or semiconductor substrates consisting essentially of:~~

~~**(i)** at least one alkanolamine;~~

~~**(ii)** at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof;~~

~~**(iii)** at least one polyfunctional organic acid with at least two carboxylic acid groups; and~~

~~**(iv)** water.~~

~~**3.** A composition for cleaning microelectronic devices or semiconductor substrates consisting of:~~

~~**(i)** at least one alkanolamine;~~

~~**(ii)** at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof;~~

~~**(iii)** at least one polyfunctional organic acid with at least two carboxylic acid groups; and~~

~~**(iv)** water.~~

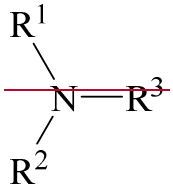
~~**4.**~~**2.** The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one alkanolamine comprises at least two alkanolamines.

~~**5.**~~**3.** The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one alkanolamine comprises at least three alkanolamines.

~~**6.** The composition of any of claims 1-3, wherein the at least one alkanolamine consists of two alkanolamines.~~

~~**7.** The composition of any of claims 1-3, wherein the at least one alkanolamine consists of three alkanolamines.~~

~~**8.** The composition of any of claims 1-3, wherein the at least one alkanolamine has the following structure:~~



~~wherein R^1, R^2 and R^3 are each independently selected from:~~

~~**(a)** hydrogen,~~

~~**(b1)** a C_1-C_{20} straight chain alkyl group,~~

~~**(b2)** a C_4-C_{20} branch chain alkyl group,~~

~~**(b3)** a C_3-C_{20} cyclic alkyl group;~~

~~**(c)** an unsubstituted C_2-C_{20} alkyl ether group;~~

~~**(d)** a C_1-C_{20} alkanol group~~

~~**(e)** a C_2-C_{20} alkyl ether group substituted with an -OH group; and~~

~~wherein at least one of R^1, R^2 and R^3 must be (d) or (e).~~

~~**9.** The composition of claim 8, wherein at least one alkanolamine comprises (c) or (e).~~

~~**10.**__**4.**__ The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one alkanolamine are selected from monoethanolamine (MEA), aminoethoxyethanol, methanolamine, N-methyl ethanolamine, N-ethyl ethanolamine, N, N-dimethylethanolamine, N, N-diethylethanolamine, N-methyl diethanolamine, N-ethyl diethanolamine, diethanolamine, triethanol amine (TEA), tertiarybutyldiethanol amine, isopropanolamine, 2-amino- l-propanol, 3-amino-l-propanol, 2-amino-l-butanol, isobutanolamine, 2-amino-2-ethoxypropanol, 2-amino-2-ethoxyethanol and mixtures thereof.

~~**11.**__**5.**__ The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one alkanolamine are selected from aminoethoxyethanol, 2-amino-2-ethoxypropanol, 2-amino-2-ethoxyethanol, and mixtures thereof.

~~**12.**__**6.**__ The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one alkanolamine comprise monoethanolamine, isopropanolamine, 2-(2-aminoethoxy)ethanol.

~~**13.** The composition of any of claims 1-3, wherein the at least one alkanolamine consist essentially of monoethanolamine, isopropanolamine, 2-(2-aminoethoxy)ethanol.~~

~~**14.** The composition of any of claims 1-3, wherein the at least one alkanolamine consist of monoethanolamine, isopropanolamine, 2-(2-aminoethoxy)ethanol.~~

~~15.~~7. The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof comprises one or more of N-isopropylhydroxylamine, N-methylhydroxylamine, dimethylhydroxylamine, N-ethylhydroxylamine, diethylhydroxylamine, N-propylhydroxylamine, dipropylhydroxylamine, and N-tert-butyl-hydroxylamine, N,O-dimethylhydroxylamine, O-Methylhydroxylamine, O-Ethylhydroxylamine, O-Propylhydroxylamine, hydroxylamine sulfate, hydroxylamine nitrate, Hydroxylamine hydrochloride, N-tert-Butylhydroxylamine hydrochloride, hydroxylamine phosphate, hydroxylamine acetate, N-(tert-Butyl)hydroxylamine acetate , hydroxylamine citrate, Hydroxylamine, and perchlorate, N-methylhydroxylamine hydrochloride.

~~16.~~8. The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof comprises one or more of hydroxylamine, hydroxylamine sulfate and hydroxylamine phosphate.

~~17.~~9. The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof comprises hydroxylamine.

~~18. The composition of any of claims 1-3, wherein the at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof consists essentially of hydroxylamine.~~

~~19. The composition of any of claims 1-3, wherein the at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof consists of hydroxylamine.~~

~~20.~~10. The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof comprises hydroxylamine sulfate.

~~21. The composition of any of claims 1-3, wherein the at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof consists essentially of hydroxylamine sulfate.~~

~~22. The composition of any of claims 1-3, wherein the at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof consists of hydroxylamine sulfate.~~

~~23.~~11. The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one polyfunctional organic acid is one or more of oxalic acid, malonic acid, malic acid, tartaric acid, succinic acid, citric acid, (ethylenedinitrilo)tetraacetic acid (EDTA), butylenediaminetetraacetic acid, (1,2-cyclohexylenedinitrilo-)tetraacetic acid (CyDTA), diethylenetriaminepentaacetic acid (DETPA), ethylenediaminetetrapropionic acid, (hydroxyethyl)ethylenediaminetriacetic acid (HEDTA), triethylenetetraminehexaacetic acid (TTHA), 1,3-diamino-2-hydroxypropane-N,N,N',N'-tetraacetic acid (DHPTA), methyliminodiacetic acid, propylenediaminetetraacetic acid, nitrolotriacetic acid (NTA), and phthalic acid.

~~24.~~**12.** The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one polyfunctional organic acid is one or more of citric acid, EDTA and CyDTA.

~~25.~~**13.** The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one polyfunctional organic comprises citric acid.

~~**26.** The composition of any of claims 1-3, wherein the at least one polyfunctional organic consists essentially of citric acid.~~

~~**27.** The composition of any of claims 1-3, wherein the at least one polyfunctional organic consists of citric acid.~~

~~28.~~**14.** The composition of ~~any of claims 1-3~~ claim 1, wherein the at least one polyfunctional organic comprises EDTA.

~~**29.** The composition of any of claims 1-3, wherein the at least one polyfunctional organic consists essentially of EDTA.~~

~~**30.** The composition of any of claims 1-3, wherein the at least one polyfunctional organic consists of EDTA.~~

~~31.~~**15.** The composition of ~~any of claims 1-3~~ claim 1, further comprising (v) at least one corrosion inhibitor.

~~32.~~**16.** The composition of claim ~~31~~15, wherein the at least one corrosion inhibitor is one or more of selected from phenol or derivatives of phenol or mixtures thereof or triazoles or mixtures of triazoles or mixtures of phenols or derivatives of phenol and triazoles.

~~**33.** The composition of claim 31, wherein the at least one corrosion inhibitor comprises one or both of catechol and gallic acid.~~

~~**34.** The composition of claim 31, wherein the at least one corrosion inhibitor consists essentially of one or both of catechol and gallic acid.~~

~~**35.** The composition of claim 31, wherein the at least one corrosion inhibitor consists of one or both of catechol and gallic acid.~~

~~36.~~**17.** The composition of claim ~~31~~15, wherein the at least one corrosion inhibitor comprises catechol and gallic acid.

~~**37.** The composition of claim 31, wherein the at least one corrosion inhibitor consists essentially of catechol and gallic acid.~~

~~**38.** The composition of claim 31, wherein the at least one corrosion inhibitor consists of catechol and gallic acid.~~

~~39.~~**18.** The composition of claim ~~31~~15, wherein the at least one corrosion inhibitor comprises catechol.

~~40. The composition of claim 31, wherein the at least one corrosion inhibitor consists essentially of catechol.~~

~~41. The composition of claim 31, wherein the at least one corrosion inhibitor consists of catechol.~~

~~42.~~**19.** The composition of claim ~~31~~15, wherein the at least one corrosion inhibitor comprises gallic acid.

~~43. The composition of claim 31, wherein the at least one corrosion inhibitor consists essentially of gallic acid.~~

~~44. The composition of claim 31, wherein the at least one corrosion inhibitor consists of gallic acid.~~

~~45.~~**20.** The composition of claim ~~31~~15, wherein

(a) the at least three alkanolamines (i) comprise monoethanolamine, isopropanolamine and 2-(2-aminoethoxy)ethanol;

(b) the at least one hydroxylamine or derivatives of hydroxylamine or mixtures thereof (ii) comprises one of hydroxylamine and hydroxylamine sulfate;

(c) the at least one polyfunctional organic acid with at least two carboxylic acid groups (iii) comprises citric acid; and

(d) the at least one corrosion inhibitor (v) comprises at least one of catechol and gallic acid.

~~46.~~**21.** The composition of claim ~~45~~20, wherein the composition has a pH of between approximately 9.5 and approximately 10.6.

~~47. The composition of claim 45, wherein the composition has a pH of approximately 10.~~

~~48. A method of cleaning a semiconductor substrate comprising the steps of:~~

~~(i) contacting said substrate with a composition of any of claims 1-47; and~~

~~(ii) rinsing said substrate.~~