

**WHAT IS CLAIMED IS**

1. A polishing composition, comprising:  
an abrasive;  
optionally, a pH adjuster;  
a barrier film removal rate enhancer;  
a TEOS removal rate inhibitor;  
a cobalt removal rate enhancer;  
an azole-containing corrosion inhibitor; and  
a cobalt corrosion inhibitor;  
wherein the barrier film removal rate enhancer is different from the cobalt removal rate enhancer.
2. The polishing composition of claim 1, wherein the abrasive is selected from the group consisting of alumina, silica, titania, ceria, zirconia, co-formed products of alumina, silica, titania, ceria, or zirconia, coated abrasives, surface modified abrasives, and mixtures thereof.
3. The polishing composition of claim 1, wherein the abrasive is in an amount of from about 0.1% to about 25% by weight of the composition.
4. The polishing composition of claim 1, wherein the composition comprises the pH adjuster and the pH adjuster is selected from the group consisting of ammonium hydroxide, sodium hydroxide, potassium hydroxide, cesium hydroxide, monoethanolamine, diethanolamine, triethanolamine, methylethanolamine, methyldiethanolamine tetrabutylammonium hydroxide, tetrapropylammonium hydroxide, tetraethylammonium hydroxide, tetramethylammonium hydroxide, ethyltrimethylammonium hydroxide, diethyldimethylammonium hydroxide, dimethyldipropylammonium hydroxide, benzyltrimethylammonium hydroxide, tris(2-hydroxyethyl)methylammonium hydroxide, choline hydroxide, and any combinations thereof.

5. The polishing composition of claim 1, wherein the pH adjuster is in an amount of from about 0.01% to about 10% by weight of the composition.

6. The polishing composition of claim 1, wherein the barrier film removal rate enhancer is an organic acid or a salt thereof selected from the group consisting of gluconic acid, lactic acid, citric acid, tartaric acid, malic acid, glycolic acid, malonic acid, formic acid, oxalic acid, acetic acid, propionic acid, succinic acid, lactic acid, amino acetic acid, phenoxyacetic acid, bicine, phosphoric acid, diglycolic acid, glyceric acid, tricine, benzoic acid, nitrilotriacetic acid, ethylenediaminetetraacetic acid, pentetic acid, diaminocyclohexanetetraacetic acid, ethyl phosphoric acid, cyanoethyl phosphoric acid, phenyl phosphoric acid, vinyl phosphoric acid, poly(vinylphosphonic acid), 1-hydroxyethane-1,1-diphosphonic acid, nitrilotri(methylphosphonic acid), diethylenetriaminepentakis (methylphosphonic acid), N,N,N',N'-ethylenediaminetetrakis(methylene phosphonic acid), n-hexylphosphonic acid, benzylphosphonic acid, phenylphosphonic acid, and salts and mixtures thereof.

7. The polishing composition of claim 1, wherein the barrier film removal rate enhancer is in an amount of from about 0.01% to about 3% by weight of the composition.

8. The polishing composition of claim 1, wherein the TEOS removal rate inhibitor is an amine containing compound selected from the group consisting of alkanolamines and cationic polymers.

9. The polishing composition of claim 8, wherein the alkanolamine is a secondary or tertiary amine.

10. The polishing composition of claim 9, wherein the alkanolamine is selected from the group consisting of dimethylethanolamine, diethylethanolamine, triethanolamine, dimethylisopropanolamine, tiisopropanolamine, diisopropylethanolamine, methyl-diethanolamine, ethyl-diethanolamine, isopropanoldiethanolamine, isopropyldiethanolamine, butyldiethanolamine, cyclohexyldiethanolamine, aminopropyl

diethanolamine, aminopropyl diisopropanolamine, diethanolamine, diisopropanolamine, methylethanolamine, di-sec-butanolamine, butylethanolamine, N-acetyethanolamine, and mixtures thereof.

11. The polishing composition of claim 8, wherein the TEOS removal rate inhibitor is a cationic polymer.

12. The polishing composition of claim 11, wherein the cationic polymer is selected from the group consisting of polyethyleneimines, polypropyleneimines, chitosans, poly(diallyldimethylammonium salt)s, poly(ester amine)s, poly(amidoamine)s, polylysines, poly(allylamine)s, poly(amino-co-ester)s, polyornithines, poly(2-ethyl-2-oxazoline)s, polyquateriums, cationic polymers that include at least one hindered amine containing group, and mixtures thereof.

13. The polishing composition of claim 12, wherein the hindered amine containing group is 2,2,6,6-tetramethylpiperidiny1.

14. The polishing composition of claim 11, wherein the cationic polymer has a number average molecular weight between about 500 g/mol and about 50,000 g/mol.

15. The polishing composition of claim 1, wherein the TEOS removal rate inhibitor in an amount of from about 0.001% to about 15% by weight of the composition.

16. The polishing composition of claim 1, wherein the cobalt removal rate enhancer is an organic acid or a salt thereof selected from the group consisting of gluconic acid, lactic acid, citric acid, tartaric acid, malic acid, glycolic acid, malonic acid, formic acid, oxalic acid, acetic acid, propionic acid, succinic acid, lactic acid, amino acetic acid, phenoxyacetic acid, bicine, diglycolic acid, glyceric acid, tricine, alanine, glycine, serine, methionine, leucine, histidine, valine, phenylalanine, proline, glutamine, aspartic acid, glutamic acid, arginine, lysine, tyrosine, benzoic acid, and salts and mixtures thereof.

17. The polishing composition of claim 1, wherein the cobalt removal rate enhancer is in an amount of from about 0.01% to about 5% by weight of the composition.

18. The polishing composition of claim 1, wherein the azole-containing corrosion inhibitor is selected from the group consisting of tetrazole, benzotriazole, tolyltriazole, 5-methylbenzotriazole, ethyl benzotriazole, propyl benzotriazole, butyl benzotriazole, pentyl benzotriazole, hexyl benzotriazole, dimethyl benzotriazole, chloro benzotriazole, dichloro benzotriazole, chloromethyl benzotriazole, chloroethyl benzotriazole, phenyl benzotriazole, benzyl benzotriazole, aminotriazole, aminobenzimidazole, pyrazole, imidazole, aminotetrazole, adenine, benzimidazole, thiabendazole, 1,2,3-triazole, 1,2,4-triazole, 1-hydroxybenzotriazole, 2-methylbenzothiazole, 2-aminobenzimidazole, 2-amino-5-ethyl-1,3,4-thiadazole, 3,5-diamino-1,2,4-triazole, 3-amino-5-methylpyrazole, 4-amino-4H-1,2,4-triazole, and combinations thereof.

19. The polishing composition of claim 1, wherein the azole-containing corrosion inhibitor in an amount of from about 0.001% to about 3% by weight of the composition.

20. The polishing composition of claim 1, wherein the cobalt corrosion inhibitor is an anionic surfactant.

21. The polishing composition of claim 20, wherein the anionic surfactant comprises one or more phosphate groups and one or more of the following: a six to twenty four carbon alkyl chain, zero to eighteen ethylene oxide groups, or a combination of a six to twenty four carbon alkyl chain and multiple ethylene oxide groups.

22. The polishing composition of claim 1, wherein the cobalt corrosion inhibitor in an amount of from about 0.001% to about 1% by weight of the composition.

23. The polishing composition of claim 1, wherein the composition comprises:

the abrasive in an amount of from about 0.1% to about 25% by weight of the composition;

the pH adjuster in an amount of from about 0.01% to about 10% by weight of the composition;

the barrier film removal rate enhancer in an amount of from about 0.01% to about 3% by weight of the composition;

the TEOS removal rate inhibitor in an amount of from about 0.001% to about 15% by weight of the composition;

the cobalt removal rate enhancer is in an amount of from about 0.01% to about 5% by weight of the composition;

the azole-containing corrosion inhibitor in an amount of from about 0.001% to about 3% by weight of the composition; and

the cobalt corrosion inhibitor in an amount of from about 0.001% to about 1% by weight of the composition.

24. The polishing composition of claim 1, wherein the pH of the composition is between about 7 and about 14.

25. A polishing composition, comprising:  
an abrasive;  
optionally, a pH adjuster;  
an organic acid or a salt thereof;  
an amino acid;  
an alkanolamine or a cationic polymer;  
an azole-containing corrosion inhibitor; and  
an anionic surfactant;  
wherein the organic acid is different from the amino acid.

26. A method of polishing a substrate, comprising the steps of:

applying the polishing composition of claim 1 to a surface of a substrate, wherein the surface comprises cobalt; and

bringing a pad into contact with the surface of the substrate and moving the pad in relation to the substrate.