CLAIMS

What is claimed is:

1. A chemical mechanical polishing composition, comprising:

an abrasive;

an additive selected from the group consisting of a surfactant, a removal rate enhancer, a biocide, a surface finisher, a pH adjuster, a defect reduction agent, a dishing reducer, a dynamic surface tension reducer, a corrosion inhibitor, or any mixtures thereof; and

water,

wherein the polishing composition has a value of less than 800,000 for the relation: large particle counts/weight percent abrasive, wherein the large particle count is the total number of particles larger than 0.2 microns per milliliter of the composition.

2. The composition of claim 1, wherein the composition comprises a removal rate enhancer selected from the group consisting of organic acids, and organic acid salts, amino acids, carboxylic acids, polyamines, ammonia based compounds, quaternary ammonium compounds, inorganic acids, compounds with both carboxylic and amino functions, ethylenediaminetetraacetic acid, diethylene triamine pentaacetic acid, and any mixtures thereof.

3. The composition of claim 1, wherein the composition comprises an amino acid as a removal rate enhancer.

4. The composition of claim 1, wherein the composition comprises a corrosion inhibitor selected from the group consisting of azole and azole derivatives.

5. The composition of claim 4, wherein the corrosion inhibitor is selected from the group consisting of benzotriazole, benzotriazole derivatives, tolyltriazole, and mixtures thereof.

6. The composition of claim 1, wherein the abrasive is selected from the group consisting of alumina, fumed silica, colloidal silica, coated particles, titania, ceria, zirconia, and any mixtures thereof.

7. The composition of claim 6, wherein the abrasive is selected from the group consisting of fumed silica, colloidal silica, and mixtures thereof.

8. The composition of claim 1, wherein the amount of abrasive in the composition is at least 0.05% by weight.

9. The composition of claim 1, further comprising an oxidizer selected from the group consisting of hydrogen peroxide, ammonium persulfate, silver nitrate, ferric nitrates, ferric chloride, per acid, per salts, ozone water, potassium ferricyanide, potassium dichromate, potassium iodate, potassium bromate, vanadium trioxide, hypochlorous acid, sodium hypochlorite, potassium hypochlorite, calcium hypochlorite, magnesium hypochlorite, ferric nitrate, $KMnO_4$, other inorganic or organic peroxides, and any mixtures thereof.

10. The composition of claim 1, wherein the composition is not filtered prior to measuring the large particle counts/weight % abrasive.

11. The composition of claim 1, wherein the composition is aged for at least 3 days after formulation prior to measuring the large particle counts/ weight % abrasive.

12. The composition of claim 1, wherein the polishing composition has a value of less than 50,000 for the relation: large particle counts/weight percent abrasive, wherein the large particle count is the total number of particles larger than 0.2 microns per milliliter of the composition.

13. A chemical mechanical polishing composition, comprising:

an abrasive;

a first removal rate enhancer selected from the group consisting of organic acids, and organic acid salts, amino acids, carboxylic acids, polyamines, ammonia based compounds, quaternary ammonium compounds, inorganic acids, compounds with both carboxylic and amino functions, ethylenediaminetetraacetic acid, diethylene triamine pentaacetic acid, and any mixtures thereof;

a corrosion inhibitor selected from the group consisting of azole and azole derivatives; and

water,

wherein the polishing composition has a value of less than 800,000 for the relation: large particle counts/weight percent abrasive, wherein the large particle count is the total number of particles larger than 0.2 microns per milliliter of the composition.

14. The composition of claim 13, wherein the first removal rate enhancer is an amino acid.

15. The composition of claim 13, wherein the corrosion inhibitor is selected from the group consisting of benzotriazole, benzotriazole derivatives, tolyltriazole, and mixtures thereof.

16. The composition of claim 13, wherein the abrasive is selected from the group consisting of alumina, fumed silica, colloidal silica, coated particles, titania, ceria, zirconia, and any mixtures thereof.

17. The composition of claim 13, wherein the amount of abrasive in the composition is at least 0.05% by weight.

18. The composition of claim 13, further comprising at least one selected from the group consisting of a surfactant, a second removal rate enhancer, a biocide, a surface finisher, a

pH adjuster, a defect reduction agent, a dishing reducer, a dynamic surface tension reducer, or any mixtures thereof.

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

applying the composition of claim 1 to the substrate; and

applying pressure to the substrate with a polishing pad, to remove at least a portion of the surface of the substrate.

20. The method of polishing a substrate of claim 19, wherein the portion of the surface of the substrate comprises copper.

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

applying the composition of claim 13 to the substrate; and

applying pressure to the substrate with a polishing pad, to remove at least a portion of the surface of the substrate.

22. The method of polishing a substrate of claim 21, wherein the portion of the surface of the substrate comprises copper.

23. A method of preparing a polishing composition, wherein the polishing composition comprises:

an abrasive;

an additive selected from the group consisting of a surfactant, a removal rate enhancer, a biocide, a surface finisher, a pH adjuster, a defect reduction agent, a dishing reducer, a dynamic surface tension reducer, a corrosion inhibitor, or any mixtures thereof; and

water;

wherein the polishing composition has a value of less than 800,000 for the relation: large particle counts/weight percent abrasive, wherein the large particle count is the total number of particles larger than 0.2 microns per milliliter of the composition;

wherein the method comprises the steps of:

selecting the abrasive so that it conforms to the value; and

combining the abrasive, the additive, and the water.

24. The method of claim 23, wherein the abrasive is not filtered before the combining step.

25. The method of claim 23, further comprising the step of chemically treating the abrasives so that they conform to the value.

26. The method of claim 23, further comprising the step of forming the abrasives via chemical synthesis so that they conform to the value.

27. The method of claim 23, wherein the additive is a removal rate enhancer selected from the group consisting of organic acids, and organic acid salts, amino acids, carboxylic acids, polyamines, ammonia based compounds, quaternary ammonium compounds, inorganic acids, compounds with both carboxylic and amino functions, ethylenediaminetetraacetic acid, diethylene triamine pentaacetic acid, and any mixtures thereof

28. The method of claim 27, wherein the removal rate enhancer is an amino acid.

29. The method of claim 23, wherein the additive is a corrosion inhibitor selected from the group consisting of azole and azole derivatives.

30. The method of claim 29, wherein the corrosion inhibitor is selected from the group consisting of benzotriazole, benzotriazole derivatives, tolyltriazole, and mixtures thereof.

31. The method of claim 23, wherein the polishing composition has a value of less than 50,000 for the relation: large particle counts/weight percent abrasive, wherein the large particle count is the total number of particles larger than 0.2 microns per milliliter of the composition.