CLAIMS

1. A chemical-mechanical polishing composition comprising:

a. at least one oxidizer

b. at least one catalyst having multiple oxidation states; and

c. an abrasive comprising an abrasive particle consisting essentially of a primary particle modified with an aluminosilicate layer, and wherein the abrasive particle has a zeta potential measured at pH 2.3 of about -5 mV to about -100m V.

2. The composition according to claim 1 wherein the abrasive particles have a zeta potential of about -10 mV to about -50mV.

3. The composition according to claim 1 wherein the primary particle is selected from the group consisting of silica, alumina, ceria, and clay.

4. The composition of claim 3, wherein the primary particle is silica.

5. The composition according to claim 1 wherein the oxidizer is hydrogen peroxide.

6. The composition according to claim 5 wherein the hydrogen peroxide concentration is from about 1 wt.% to about 6 wt.% of the composition.

7. The composition according to claim 1 wherein the concentration of the abrasive particles is from about 0.05 wt.% to about 4 wt.% of the composition.

8. The composition of claim 4 wherein the silica is fumed silica.

9. The composition of claim 1 wherein the catalyst is ferric nitrate.

10. The composition of claim 1 further comprising a stabilizer which inhibits the catalyst from reacting with the oxidizing agent.

11. The composition of claim 10 wherein the stabilizer is malonic acid.

12. A method of chemical mechanical polishing, said method comprising:

(i) providing a substrate comprising tungsten;

(ii) providing a polishing composition according to any one of claims 1, 2 or 5-7,

(iii) contacting the substrate with a polishing pad and the polishing composition,

(iv) moving the substrate relative to the polishing pad and the polishing composition, and

(v) abrading at least a portion of the substrate to polish the substrate.

13. An abrasive particle for use in chemical mechanical polishing comprising a silica particle having an aluminosilicate layer, wherein the abrasive particle has a zeta potential measured at pH 2.3 of about -5 mV to about -100 mV.

14. The abrasive particle of claim 13 wherein the abrasive particle has a zeta potential measured at pH 2.3 of about -10 mV to about -50 mV.

15. The abrasive particle of claim 13 wherein the silica particle is fumed silica

The invention claimed is:

1. A chemical-mechanical polishing composition comprising:

a. at least one oxidizer

b. at least one catalyst having multiple oxidation states; and

c. an abrasive comprising an abrasive particle consisting essentially of a primary particle modified with an aluminosilicate layer, and wherein the abrasive particle has a zeta potential measured at pH 2.3 of about ⁻5 mV to about ⁻100 mV.

2. The composition according to claim **1** wherein the primary particle is selected from the group consisting of silica, alumina, ceria, and clay.

3. The composition of claim **2**, wherein the primary particle is silica.

4. The composition of claim **3** wherein the silica is fumed silica.

5. The composition according to claim **1** wherein the at least one oxidizer is hydrogen peroxide.

6. The composition according to claim **5** wherein the hydrogen peroxide concentration is from about 1 wt. % to about 6 wt. % of the composition.

7. The composition of claim **1** further comprising a stabilizer which inhibits the at least one catalyst from reacting with the at least one oxidizer.

8. The composition of claim **7** wherein the stabilizer is malonic acid.

9. The composition according to claim **1** wherein the abrasive particles have a zeta potential of about −10 mV to about −50 mV.

10. The composition according to claim **1** wherein the concentration of the abrasive particles is from about 0.05 wt. % to about 4 wt. % of the composition.

11. The composition of claim 1 wherein the at least one catalyst is ferric nitrate.

12. A method of chemical mechanical polishing, said method comprising:

(i) providing a substrate comprising tungsten;

(ii) providing a polishing composition comprising:

(a) at least one oxidizer

(b) at least one catalyst having multiple oxidation states; and

(c) an abrasive comprising an abrasive particle consisting essentially of a primary particle modified with an aluminosilicate layer, and wherein the abrasive particle has a zeta potential measured at pH 2.3 of about ⁻5 mV to about ⁻100 mV,

(iii) contacting the substrate with a polishing pad and the polishing composition,

(iv) moving the substrate relative to the polishing pad and the polishing composition, and

(v) abrading at least a portion of the substrate to polish the substrate.

13. The method of claim 12 wherein the at least one oxidizer is hydrogen peroxide.

14. The method of claim 13 wherein the hydrogen peroxide concentration is about 1 wt. % to about 5 wt. % of the polishing composition.

15. The method of claim 12 wherein the abrasive particles have a zeta potential of about −10 mV to about −50 mA.

16. The method of claim 12 wherein the primary particles comprise silica.

17. The method of claim 12 wherein the concentration of the abrasive particles is from about 0.05 wt. % to about 4 wt. % of the composition.

18. An abrasive particle for use in chemical mechanical polishing comprising a silica particle having an aluminosilicate layer, wherein the abrasive particle has a zeta potential measured at pH 2.3 of about −5 mV to about −100 mV.

19. The abrasive particle of claim 18 wherein the abrasive particle has a zeta potential measured at pH 2.3 of about −10 mV to about −50 mV.

20. The abrasive particle of claim 18 wherein the silica particle is fumed silica.