WHAT IS CLAIMED

1. A highly dilutable concentrate for polishing a substrate for semiconductor integrated circuit devices, comprising:

a) an abrasive;

b) an acid;

c) a stabilizer; and

d) water,

wherein the pH of the concentrate is between 2.2 and 2.9.

2. The concentrate according to claim 1, wherein the abrasive is selected from the group consisting of alumina, silica, titania, ceria, zirconia, co-formed products thereof, and mixtures thereof.

3. The concentrate according to claim 2, wherein the abrasive is colloidal silica.

4. The concentrate according to claim 1, wherein the abrasive is present in the concentrate in the amount of 6 wt% to 30 wt%, based on the total weight of the concentrate.

5. The concentrate according to claim 1, wherein the acid is selected from the group consisting of gluconic acid, lactic acid, citric acid, tartaric acid, malic acid, glycolic acid, malonic acid, formic acid, oxalic acid, sulfonic acid, amino acid, aminoacetic acid, hydrochloric acid, nitric acid, sulfuric acid, phosphonic acid, phosphoric acid, organo-phosphoric acid, and any mixtures thereof. .

6. The concentrate according to claim 1, wherein the acid is present in the concentrate in an amount of 0.01 wt% to 20 wt%, based on the total weight of the concentrate.

7. The concentrate according to claim 1, wherein the acid is present in the concentrate in an amount of 0.05 wt% to 3 wt%, based on the total weight of the concentrate.

8. The concentrate according to claim 1, wherein the stabilizer is selected from the group consisting of C_1-C_{12} alkanols and derivatives thereof, ethanolamine, methylaminoethanol, dimethylaminoethanol, isopropanolamine, tetramethylammonium hydroxide, tetrabutylammonium hydroxide, and any mixtures thereof.

9. The concentrate according to claim 1, wherein the stabilizer is present in the concentrate in the amount of 0.001 wt% to 5 wt%, based on the total weight of the concentrate.

10. The concentrate according to claim 1, further comprising a biocide selected from the group consisting of organotin, salicylanilides, mercaptan, quaternary ammonium compound, hydrogen peroxide, and any mixtures thereof.

11. The concentrate according to claim 10, wherein the biocide is hydrogen peroxide.

12. The concentrate according to claim 10, wherein the biocide is present in an amount of 0.001 wt% to 8 wt%, based on the total weight of the concentrate.

13. The concentrate according to claim 1, further comprising an additive selected from the group consisting of cationic surfactants, anionic surfactants, nonionic surfactants, poly-electrolytes, amphoteric surfactants, benzotriazole, triazole, benzimidazole, hydrogen peroxide, glycerol, and compounds and mixtures thereof.

14. The concentrate according to claim 1, wherein the concentrate is diluted to form a point-of-use slurry,

wherein said dilution ratio is from 0 – 60x, and

wherein said abrasive is present in an amount of 0.5 wt% to 30 wt%, based on the total weight of the slurry.

15. The concentrate according to claim 14, wherein a pH of the point-of-use slurry is between 2.2 and 3.5.

16. The slurry of claim 1, wherein the slurry consists essentially of said abrasive, said acid, said stabilizer, said water, and optionally, a biocide.

17. A method of polishing a transistor with a slurry,

the slurry comprising an abrasive, an acid, a stabilizer, and water,

the transistor comprising a polysilicon gate, a hardmask over said polysilicon gate, an etch stop layer over said hardmask, and a dielectric layer over said etch stop layer,

said method comprising the step of polishing said dielectric layer, said etch stop layer, said hardmask, and said polysilicon gate with said slurry.

18. The method of claim 17, wherein the pH of the slurry is between 2.2 and 2.9.

19. A method of polishing a multi-layer substrate with a slurry,

the slurry comprising an abrasive, an acid, a stabilizer, and water,

the substrate comprising multiple layers, wherein at least one of said layers is silicon carbide and at least one of said layers is a silica material,

said method comprising the step of polishing all of said layers with the slurry.

20. The method of claim 18, wherein the pH of the slurry is between 2.2 and 2.9.

WHAT IS CLAIMED

1. A slurry for polishing a substrate for semiconductor integrated circuit devices at the front end of the line during the fabrication process, the slurry comprising:

a) 0.2 wt % to 30 wt %, based on the total weight of the slurry, of an abrasive selected from the group consisting of alumina, silica, titania, ceria, zirconia, co-formed products thereof, and mixtures thereof;

b) 0.00033 wt % to 20 wt %, based on the total weight of the slurry, of an acid comprising hydrochloric acid, nitric acid, sulfuric acid, phosphonic acid, phosphoric acid, organo-phosphoric acid, and mixtures thereof;

c) 0.000033 wt % to 5 wt %, based on the total weight of the slurry, of a stabilizer selected from the group consisting of C_1-C_{12} alkanols and derivatives thereof, ethanolamine, methylaminoethanol, dimethylaminoethanol, isopropanolamine, tetramethylammonium hydroxide, tetrabutylammonium hydroxide, and any mixtures thereof; and

d) water,

wherein the pH of the slurry is between 2.2 and 3.5, and

wherein said slurry exhibits a removal rate selectivity ratio of from 1:1 to 2:1 for oxide to polysilicon, and

wherein said slurry exhibits a removal rate selectivity ratio of from 1:1 to 2:1 for oxide to nitride.

2. The slurry according to claim 1, wherein the abrasive is colloidal silica.

3. The slurry according to claim 1, wherein the acid is present in the concentrate in an amount of 0.0017 wt % to 3 wt %, based on the total weight of the concentrate.

4. The slurry according to claim 1, further comprising a biocide selected from the group consisting of organotin, salicylanilides, mercaptan, quaternary ammonium compound, hydrogen peroxide, and any mixtures thereof.

5. The slurry according to claim 4, wherein the biocide is hydrogen peroxide.

6. The slurry according to claim 4, wherein the biocide is present in an amount of 0.001 wt % to 8 wt %, based on the total weight of the slurry.

7. The slurry according to claim 1, further comprising an additive selected from the group consisting of cationic surfactants, anionic surfactants, nonionic surfactants, poly-electrolytes, amphoteric surfactants, benzotriazole, triazole, benzimidazole, hydrogen peroxide, glycerol, and compounds and mixtures thereof.

8. A slurry for polishing a substrate for semiconductor integrated circuit devices at the front end of the line during the fabrication process, the slurry comprising:

a) 0.5 wt % to 10 wt %, based on the total weight of the slurry, an abrasive selected from the group consisting of alumina, silica, titania, ceria, zirconia, co-formed products thereof, and mixtures thereof;

b) 0.005 wt % to 1.0 wt %, based on the total weight of the slurry, of an acid comprising hydrochloric acid, nitric acid, sulfuric acid, phosphonic acid, phosphoric acid, organo-phosphoric acid, and mixtures thereof;

c) 0.0025 wt % to 2 wt %, based on the total weight of the slurry, of a stabilizer selected from the group consisting of C_1-C_{12} alkanols and derivatives thereof, ethanolamine, methylaminoethanol, dimethylaminoethanol, isopropanolamine, tetramethylammonium hydroxide, tetrabutylammonium hydroxide, and any mixtures thereof; and

d) water,

wherein the pH of the slurry is between 2.2 and 3.5,

wherein said slurry exhibits a removal rate selectivity ratio of from 1:1 to 2:1 for oxide to polysilicon, and

wherein said slurry exhibits a removal rate selectivity ratio of from 1:1 to 2:1 for oxide to nitride.