Claims:

1. A method for treating a substrate, comprising:

spinning a chuck having the substrate mounted thereon; and

dispensing a mixture of sulfuric acid and periodic acid onto the substrate as the chuck is spinning, the mixture being at a temperature in the range of 110°C to 145°C, such that a dwell time of the process mixture on the substrate is from one to five minutes;

wherein sulfuric acid is present in said mixture at a range of 70-99.5 wt.% and periodic acid is present in said mixture at a range of 0.1-10 wt.%, calculated as H_5IO_6 and H_2SO_4.

2. The method according to claim 1, wherein the periodic acid is present in said mixture at a range of 0.2-2 wt.%, calculated as H_5IO_6.

3. The method according to claim 1, wherein the substrate is a semiconductor wafer in an apparatus for single wafer wet processing.

4. The method according to claim 3, wherein the semiconductor wafer comprises an ion-implanted photoresist.

5. The method according to claim 4, wherein the semiconductor wafer comprises an arsenic ion-implanted photoresist.

6. The method according to claim 4, wherein the semiconductor wafer comprises a boron ion-implanted photoresist.

7. The method according to claim 1, wherein said dispensing occurs for four minutes or less.

8. The method according to claim 1, wherein said mixture has a water concentration of 0.5 up to 2wt.-%

9. The method according to claim 1, wherein said dispensing is effected at a flow rate of 0.5 to 5.0 l/min.

10. The method according to claim 1, wherein said dispensing comprises recycling said mixture.

11. The method according to claim 10, wherein said recycling comprises reoxidizing said mixture with ozone.

12. The method according to claim 1, wherein said spinning and said dispensing are controlled so as to produce a shear flow rate of approximately 1.5 l/min across the substrate.

Claims

[Claim 0001] A method for treating a substrate, comprising:
contacting the substrate with a mixture of sulfuric acid and per-halogenic acid, the mixture being at a temperature in the range of 110°C to 145°C, for 15 minutes or less.

[Claim 0002] The method according to claim 1, wherein the perhalogenic acid is periodic acid (H_5IO_6).

[Claim 0003] The method according to claim 1, wherein the sulfuric acid is present at a range of 50-99.5 wt.% and perhalogenic acid is present in said mixture at a range of 0.1-10 wt.% , calculated as H_5IO_6 and H_2SO_4.

[Claim 0004] The method according to claim 3, wherein the sulfuric acid is present at a range of 70-99.5 wt.% and perhalogenic acid is present in said mixture at a range of 0.2-2 wt.%, calculated as H_5IO_6 and H_2SO_4.

[Claim 0005] The method according to claim 1, wherein the substrate is a semi-conductor wafer in an apparatus for single wafer wet processing.

[Claim 0006] The method according to claim 5, wherein the semiconductor wafer comprises an ion-implanted photoresist.

[Claim 0007] The method according to claim 6, wherein the semiconductor wafer comprises an arsenic ion-implanted photoresist.

[Claim 0008] The method according to claim 6, wherein the semiconductor wafer comprises a boron ion-implanted photoresist.

[Claim 0009] The method according to claim 1, wherein the substrate is contacted with the mixture of sulfuric acid and perhalogenic acid for ten minutes or less.

[Claim 0010] The method according to claim 1, wherein the substrate is contacted with the mixture of sulfuric acid and perhalogenic acid for four minutes or less.

[Claim 0011] The method according to claim 1, wherein a water concentration of 0.5 up to 2wt.-%

[Claim 0012] A composition for treating a substrate, comprising:
a stable mixture of sulfuric acid and perhalogenic acid, wherein the temperature of the mixture is in the range of 110°C to 145°C.

[Claim 0013] The composition according to claim 12, wherein the perhalogenic acid is an aqueous solution of 45-65 weight% periodic acid (calculated as H_5IO_6).

[Claim 0014] The composition according to claim 12, wherein the sulfuric acid and perhalogenic acid are present in said mixture in relative proportions of

1/100 to 1/5, expressed as weight/weight of perhalogenic acid to sulfuric acid, calculated as H_5IO_6 and H_2SO_4.

[Claim 0015] The composition according to claim 14, wherein the sulfuric acid and perhalogenic acid are present in said mixture in relative proportions of 1/10, expressed as weight/weight of perhalogenic acid to sulfuric acid, calculated as H_5IO_6 and H_2SO_4.