

CLAIMS

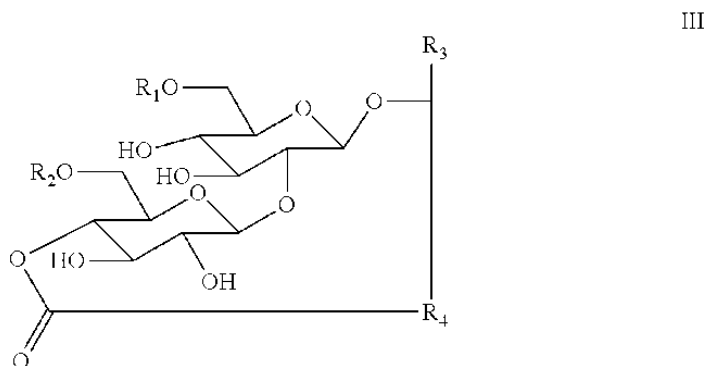
1. A post-Chemical Mechanical Polishing/Planarization (CMP) cleaning composition, comprising:
 - at least one pH adjusting agent; and
 - at least one biosurfactant selected from the group consisting of glycolipids, lipopeptides, and mixtures thereof, wherein the at least one biosurfactant is in an amount from 0.0001% to 50% by weight of the composition;wherein the composition has a pH of from 1 to 14, and wherein the composition has a removal rate of at least 30% of total defect counts (TDC) remaining on a substrate surface after a polishing/CMP process.
2. The composition of claim 1, wherein the at least one pH adjusting agent comprises a carboxylic acid, an amino acid, a sulfonic acid, phosphoric acid, or a phosphonic acid.
3. The composition of claim 1, wherein the at least one pH adjusting agent comprises at least one carboxylic acid.
4. The composition of claim 1, wherein the at least one pH adjusting agent is selected from the group consisting of formic acid, acetic acid, malonic acid, citric acid, propionic acid, malic acid, adipic acid, succinic acid, lactic acid, oxalic acid, hydroxyethylidene diphosphonic acid, 2-phosphono-1,2,4-butane tricarboxylic acid, aminotrimethylene phosphonic acid, hexamethylenediamine tetra(methylenephosphonic acid), bis(hexamethylene)triamine phosphonic acid, amino acetic acid, peracetic acid, potassium acetate, phenoxyacetic acid, glycine, bicine, diglycolic acid, glyceric acid, tricine, alanine, histidine, valine, phenylalanine, proline, glutamine, aspartic acid, glutamic acid, arginine, lysine, tyrosine, benzoic acid, and mixtures thereof.
5. The composition of claim 1, wherein the at least one pH adjusting agent is in an amount of from 0.00001% to 50% by weight of the composition.

6. The composition of claim 1, where the composition comprises at least two pH adjusting agents.

7. The composition of claim 1, wherein the at least one biosurfactant comprises a glycolipid selected from the group consisting of a rhamnolipid, a sophorolipid, a trehalose lipid, a mannosylerythritol lipid, and mixtures thereof.

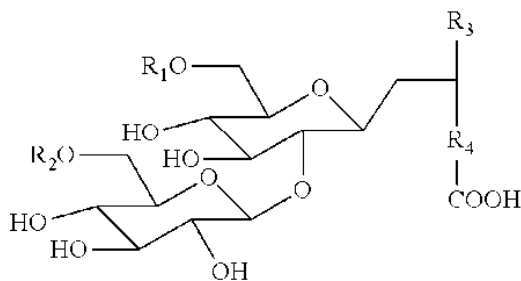
8. The composition of claim 7, wherein the glycolipid is a rhamnolipid selected from the group consisting of a mono-rhamnolipid, a di-rhamnolipid, and a mixture thereof.

9. The composition of claim 7, wherein the at least one biosurfactant comprises a sophorolipid of formula (III):



in which R₁ and R₂ each represent H or COCH₃; R₃ represents H or CH₃; and R₄ represents a saturated or unsaturated C₁₂₋₁₆ hydrocarbon group when R₃ is H, and R₄ represents a saturated or unsaturated C₁₁₋₁₅ hydrocarbon group when R₃ is CH₃.

10. The composition of claim 7, wherein the at least one biosurfactant comprises a sophorolipid of formula (IV):



in which R_1 and R_2 each represent H or COCH_3 ; R_3 represents H or CH_3 ; and R_4 represents a saturated or unsaturated C_{12-16} hydrocarbon group when R_3 is H, and R_4 represents a saturated or unsaturated C_{11-15} hydrocarbon group when R_3 is CH_3 .

11. The composition of claim 7, wherein the glycolipid comprises at least 5% to at most 95% by weight acidic-type sophorolipid.
12. The composition of claim 1, wherein the at least one biosurfactant comprises a lipopeptide selected from the group consisting of surfactin, iturin, fengycin, lichenysin, mixtures thereof.
13. The composition of claim 1, wherein the at least one biosurfactant is in an amount from 0.001% to 50% by weight of the composition.
14. The composition of claim 1, wherein the at least one biosurfactant is the only surfactant in the composition.
15. The composition of claim 1, further comprising:
a second surfactant different from the at least one biosurfactant, the second surfactant being selected from the group consisting of anionic surfactants, non-ionic surfactants, and cationic surfactants.
16. The composition of claim 1, further comprising at least one anionic polymer.
17. The composition of claim 1, further comprising at least one dienoic acid.

18. A method for cleaning a substrate, comprising:
polishing a substrate by using a CMP composition to form a polished substrate; and
contacting the polished substrate with the composition of claim 1 to clean the polished substrate.

19. The method of claim 18, wherein the substrate is a wafer having a surface comprising SiN, SiC, TiN, TaN, W, silicon oxides, Cu, Co, Ru, Mo, Ti, Ta, Al, carbon, silicon, hafnium oxide, aluminum oxide, zirconium oxide, p-Si, or a combination thereof.