We Claim:

1. An aqueous polishing composition comprising

(A) at least one water-soluble or water-dispersible compound selected from the group consisting of N-substituted diazenium dioxides and N'-hydroxy-diazenium oxide salts; and

(B) at least one type of abrasive particles.

2. The aqueous polishing composition according to claim 1, characterized in that the N-substituted diazenium dioxides (A) are of the general formula I:

$R[-N^+(-O^-)=N-OH]_n$ (I),

wherein the variable R designates a moiety containing or consisting of at least one residue selected from the group consisting of monomeric, oligomeric and polymeric, substituted and unsubstituted, saturated and unsaturated aliphatic and cycloaliphatic groups not containing or containing at least one heteroatom and/or at least one bifunctional or trifunctional linking group, and monomeric, oligomeric and polymeric substituted and unsubstituted aromatic groups not containing or containing at least one heteroatom; and wherein the index n is a number of from 1 to 1000;

and that the N-substituted N'-hydroxy-diazenium oxide salts (A) are of the general formula II:

$\{R[-N(-O)-N-O]^-_n\}_m\ (M^{m+})_n$ (II),

wherein the variable R has the above-mentioned meaning, M is selected from the group consisting of organic and inorganic, monomeric, oligomeric and polymeric cations, and the indices n and m are both numbers of from 1 to 2000.

3. The aqueous polishing composition according to claim 2, characterized in that n and m are both integers of from 1 to 10.

4. The aqueous polishing composition according to claim 3, characterized in that it contains, based on a complete weight of the polishing composition, 0.01 to 1000 ppm of the compound (A).

5. The aqueous polishing composition according to anyone of the claims 1 to 4, characterized in that the abrasive particles (B) are selected from the group

consisting of alumina, silica, silicon nitride, silicon carbide, titania, zirconia, ceria, zinc oxide, and mixtures thereof.

6. The aqueous polishing composition according to claim 5, characterized in that the abrasive particles (B) contain or consist of ceria.

7. The aqueous polishing composition according to claim 5 or 6, characterized in that the abrasive particles (B) have an average particle diameter of from 1 to 1000 nm as measured by dynamic laser light scattering.

8. The aqueous polishing composition according to anyone of the 1 to 7, characterized in that it contains, based on a complete weight of the polishing composition, 0.005 to 10% by weight of the abrasive particles (B).

9. The aqueous polishing composition according to anyone of the claims 1 to 8, characterized in that it contains at least one functional component (C) different from the components (A) and (B).

10. The aqueous polishing composition according to claim 9, characterized in that the functional component (C) is selected from the group consisting of organic, inorganic and hybrid organic-inorganic abrasive particles being different from the particles (B), materials having a lower critical solution temperature LCST or an upper critical solution temperature UCST, oxidizing agents, passivating agents, charge reversal agents, organic polyols having at least 3 hydroxide groups that are not dissociable in the aqueous medium, oligomers and polymers formed from at least one monomer having at least 3 hydroxide groups that are not dissociable in the aqueous medium, complexing or chelating agents, frictive agents, stabilizing agents, rheology agents, surfactants, metal cations and organic solvents.

11. The aqueous polishing composition according to claim 10, characterized in that the charge reversal agent (C) is selected from the group consisting of monomeric, oligomeric and polymeric compounds containing at least one anionic group is selected from the group consisting of carboxylate, sulfinate, sulfate, phosphonate and phosphate groups; and in that the organic polyols having at least 3 hydroxide groups that are not dissociable in the aqueous medium, oligomers and polymers formed from at least one monomer having at least 3 hydroxide groups that are dissociable in the aqueous medium are selected from the group consisting of monosaccharides, disaccharides, oligosaccharides, polysaccharides, desoxy sugars, amino sugars, aldonic acids, ketoaldonic acids, uronic acids, aldaric acids, sugar alcohols, and cyclitols.

12. The aqueous polishing composition according to anyone of the claims 1 to 8, characterized in that it contains at least one pH-adjusting agent or buffering agent (D) different from the components (A) and (B).

13. The aqueous polishing composition according to anyone of the claims 1 to 12, characterized in that its pH value is from 3 to 10.

14. A process for polishing substrate materials for electrical, mechanical and optical devices by contacting the substrate material at least once with an aqueous polishing composition and polishing the substrate material until the desired planarity is achieved, characterized in that the aqueous polishing composition according to anyone of the claims 1 to 13 is used.

15. The process of claim 14, characterized in that the substrate material comprises at least one layer containing or consisting of at least one dielectric material.

16. The use of N-substituted diazenium dioxides and N'-hydroxy-diazenium oxide salts for manufacturing mechanical, electrical and optical devices.

17. The use according to claim 16, characterized in that the electrical devices are integrated circuit devices, liquid crystal panels, organic electroluminescent panels, printed circuit boards, micro machines, DNA chips, micro plants and magnetic heads; the mechanical devices are high precision mechanical devices; and the optical devices are optical glasses such as photo-masks, lenses and prisms, inorganic electro-conductive films such as indium tin oxide (ITO), optical integrated circuits, optical switching elements, optical waveguides, optical monocrystals such as the end faces of optical fibers and scintillators, solid laser monocrystals, sapphire substrates for blue laser LEDs, semiconductor monocrystals, and glass substrates for magnetic disks.

18. The use according to claim 17, characterized in that the integrated circuit devices contain integrated circuits with large-scale integration or very-large-scale integration, having structures with dimensions below 50 nm.

Claims

1. An invention not claimed in any divisional application.