

CLAIMS

What is claimed is:

1. ____A polishing pad stack for polishing a substrate, the polishing pad stack comprising:

____a polishing pad having a polishing surface and a back surface; and

____a compressive subpad with a first surface having a first pressure sensitive adhesive layer coated thereon, the first surface of the compressive subpad coupled directly to the back surface of the polishing pad by the first pressure sensitive adhesive layer, and wherein the first surface of the compressive subpad has a surface energy approximately in the range of 30-40 dyne/cm².

2.—____The polishing pad stack of claim 1, further comprising:

____a second pressure sensitive adhesive layer coated on a second surface of the compressive subpad, the second surface of the compressive subpad opposite the first surface.

3.—____The polishing pad stack of claim 2, wherein the first pressure sensitive adhesive layer is a permanent pressure sensitive adhesive layer, and wherein the second pressure sensitive adhesive layer is a removable pressure sensitive adhesive layer.

4.—____The polishing pad stack of claim 3, wherein the removable pressure sensitive adhesive layer is for coupling the polishing pad stack to a platen of a chemical mechanical polishing apparatus.

5.—____The polishing pad stack of claim 4, further comprising:

____a release liner disposed on the removable pressure sensitive adhesive layer.

6.— The polishing pad stack of claim 3, wherein the first pressure sensitive adhesive layer has a peel strength of greater than approximately 4.5 pounds per inch at 25 degrees Celsius, and wherein the second pressure sensitive adhesive layer has a peel strength of less than approximately 4 pounds per inch at 25 degrees Celsius.

7.— The polishing pad stack of claim 6, wherein the second pressure sensitive adhesive layer has a peel strength of less than approximately 2.5 pounds per inch at 25 degrees Celsius.

8.— The polishing pad stack of claim 1, wherein the compressive subpad is a compressive foam subpad.

9.— The polishing pad stack of claim 8, wherein the compressive foam subpad comprises a material selected from the group consisting of an ethylene vinyl acetate closed cell foam material, a polyethylene closed cell foam material, and a polyurethane mostly closed cell foam material.

~~10. The polishing pad stack of claim 1, wherein the first surface of the compressive subpad has a surface energy approximately in the range of 30-40 dyne/cm².~~

~~11.~~

10. The polishing pad stack of claim 1, wherein the compressive subpad has a thickness approximately in the range of 10 mils to 40 mils.

~~12.~~

11. The polishing pad stack of claim 1, wherein the first surface of the compressive subpad has a surface roughness of at least 3 microns and has a total surface area, and the first pressure sensitive adhesive layer is in direct contact with at least 90% of the total surface area of the first surface of the compressive subpad.

~~13.~~

12. The polishing pad stack of claim 1, wherein the first pressure sensitive adhesive layer comprises a material selected from the group consisting of an acrylic material, a rubber, ethylene vinyl acetate, a silicone material, and a block co-polymer.

~~14.~~

13. The polishing pad stack of claim 1, wherein the polishing pad comprises a thermoset polyurethane material.

~~15.~~

14. The polishing pad stack of claim 2, wherein the polishing pad comprises a polishing layer coupled to a foundation layer, and wherein the back surface of the polishing pad is a surface of the foundation layer.

~~16.~~

15. A method of fabricating subpad for a polishing pad stack for polishing a substrate, the method subpad comprising:

coating a first pressure sensitive adhesive layer on a first surface of a compressive subpad material;

coating a second pressure sensitive adhesive layer on a second, opposite, surface of the compressive subpad material; and

adhering the first surface of the compressive subpad material directly to a back surface of a polishing pad by the first pressure sensitive adhesive layer.

~~17. The method of claim 16, coating the first pressure sensitive adhesive layer comprises coating a permanent pressure sensitive adhesive layer, and wherein coating the second pressure sensitive adhesive layer comprises coating a removable pressure sensitive adhesive layer.~~

~~18. The method of claim 16, wherein coating the first pressure sensitive adhesive layer comprises dispensing and then spreading a first solvent based adhesive formulation on the first surface of the compressive subpad material, and wherein coating the second pressure sensitive adhesive layer comprises dispensing and then spreading a second solvent based adhesive formulation on the second surface of the compressive subpad material.~~

~~19. The method of claim 18, wherein dispensing and then spreading the first solvent-based adhesive formulation on the first surface of the compressive subpad material is performed prior to dispensing and then spreading the second solvent-based adhesive formulation on the second surface of the compressive subpad material.~~

~~20. The method of claim 18, wherein dispensing and then spreading the first solvent-based adhesive formulation on the first surface of the compressive subpad material is performed subsequent to dispensing and then spreading the second solvent-based adhesive formulation on the second surface of the compressive subpad material.~~

~~21. The method of claim 18, the method further comprising:~~

~~subsequent to dispensing and then spreading the first solvent-based adhesive formulation on the first surface of the compressive subpad material and dispensing and then spreading the second solvent-based adhesive formulation on the second surface of the compressive subpad material, drying the first and second solvent-based adhesive formulations to remove substantially all solvent from the first and second solvent-based adhesive formulations.~~

~~22. The method of claim 16, wherein the compressive subpad is a compressive foam subpad, the method further comprising:~~

~~prior to coating the first and second pressure sensitive adhesive layers, treating at least one of the first or second surfaces of the compressive foam subpad material with a process selected from the group consisting of a corona discharge treatment, a plasma treatment, and a flame treatment.~~

~~23. The method of claim 16, wherein coating the first pressure sensitive adhesive layer comprises applying a first solvent-based adhesive formulation on the first surface of the compressive subpad material at a temperature less than approximately 50 degrees Celsius and, subsequently, drying the first solvent-based adhesive formulation in an air dryer at a temperature less than approximately 50 degrees Celsius.~~

~~24. The method of claim 16, further comprising:~~

~~applying a release liner to the second pressure sensitive adhesive layer.~~

~~25. The method of claim 16, wherein coating the second pressure sensitive adhesive layer on the second, opposite, surface of the compressive subpad material comprises applying the second pressure sensitive adhesive layer to a release liner and then applying the second pressure sensitive adhesive layer to the second, opposite, surface of the compressive subpad by the release liner.~~

~~26. The method of claim 16, wherein adhering the first surface of the compressive subpad material directly to the back surface of the polishing pad comprises adhering the first surface of the compressive subpad material directly to the back surface of a thermoset polyurethane polishing pad.~~

~~27. A subpad for a polishing pad stack, the subpad comprising:~~

~~_____ a compressive subpad material having a first surface and a second, opposite, surface;~~

~~_____ a first pressure sensitive adhesive layer coated on the first surface of the compressive subpad material, and a first release liner disposed on the first pressure sensitive adhesive layer; and~~

~~_____ a second pressure sensitive adhesive layer coated on the second surface of the compressive subpad material, wherein the compressive subpad material is a compressive foam subpad material, and wherein the first and second surfaces of the compressive foam subpad material each have a surface energy approximately in the range of 30-40 dyne/cm².~~

~~28.~~

~~16. _____ The subpad of claim 27~~15, further comprising:

~~_____ a second release liner disposed on the second pressure sensitive adhesive layer.~~

~~29.~~

~~17. _____ The subpad of claim 27~~15, wherein the first pressure sensitive adhesive layer is a removable pressure sensitive adhesive layer, and wherein the second pressure sensitive adhesive layer is a permanent pressure sensitive adhesive layer.

~~30.~~

~~18.~~ The subpad of claim ~~29~~17, wherein the permanent pressure sensitive adhesive layer is for coupling to a back surface of a polishing pad, and wherein the removable pressure sensitive adhesive layer is for coupling the subpad to a platen of a chemical mechanical polishing apparatus.

~~31.~~

~~19.~~ The subpad of claim ~~27~~15, wherein the second pressure sensitive adhesive layer has a peel strength of greater than approximately 4.5 pounds per inch at 25 degrees Celsius, and wherein the first pressure sensitive adhesive layer has a peel strength of less than approximately 4 pounds per inch at 25 degrees Celsius.

~~32.~~

~~20.~~ The subpad of claim ~~27~~15, wherein the compressive subpad material is a compressive foam subpad material comprising a material selected from the group consisting of an ethylene vinyl acetate closed cell foam material, a polyethylene closed cell foam material, and a polyurethane mostly closed cell foam material.

~~33. The subpad of claim 27, the compressive subpad material is a compressive foam subpad material, and wherein the first and second surfaces of the compressive foam subpad material each have a surface energy approximately in the range of 30-40 dyne/cm².~~

~~34. The subpad of claim 24~~

~~21.~~ The subpad of claim 15, wherein the compressive subpad material has a thickness approximately in the range of 10 mils to 40 mils.

~~35.~~

~~22.~~ The subpad of claim ~~27~~15, wherein the second pressure sensitive adhesive layer comprises a first material selected from the group consisting of an acrylic material, a rubber, ethylene vinyl acetate, a silicone material, and a block co-polymer, and wherein the first pressure sensitive adhesive layer comprises a second material selected from the group consisting of an acrylic material, a rubber, ethylene vinyl acetate, a silicone material, and a block co-polymer.

~~36.~~

23. The subpad of claim ~~27~~15, wherein the first surface of the compressive subpad material has a surface roughness of at least 3 microns and has a total surface area, and the first pressure sensitive adhesive layer is in direct contact with at least 90% of the total surface area of the first surface of the compressive subpad material.

~~37.~~

24. The subpad of claim ~~36~~23, wherein the second surface of the compressive subpad material has a surface roughness of at least 3 microns and has a total surface area, and the second pressure sensitive adhesive layer is in direct contact with at least 90% of the total surface area of the second surface of the compressive subpad material.