

What is claimed is:

- 1) A polishing pad comprising a polishing layer having a working surface and a second surface opposite the working surface;
wherein the working surface includes a land region and at least one of a plurality of precisely shaped pores and a plurality of precisely shaped asperities;
wherein the thickness of the land region is less than about 5 mm and the polishing layer comprises a polymer; and
wherein the polishing layer includes a plurality of nanometer-size topographical features on at least one of the surface of the precisely shaped asperities, the surface of the precisely shaped pores and the surface of the land region.
- 2) The polishing pad of claim 1, wherein the working surface includes a plurality of precisely shaped pores; and, optionally, wherein the depth of the plurality of precisely shaped pores is less than the thickness of the land region adjacent to each precisely shaped pore.
- 3) The polishing pad of claim 1, wherein the working surface includes a plurality of precisely shaped asperities.
- 4) The polishing pad of claim 1, wherein the plurality of nanometer sized features include regular or irregularly shaped grooves, wherein the width of the grooves is less than about 250 nm.
- 5) The polishing pad of claim 1, wherein the polishing layer is substantially free of inorganic abrasive particles.
- ~~6) The polishing pad of claim 1, wherein the polishing layer further comprises a plurality of independent or inter-connected macro-channels.~~
- ~~7) The polishing pad of claim 1, further comprising a subpad, wherein the subpad is adjacent to the second surface of the polishing layer.~~

~~8) The polishing pad of claim 1, further comprising a foam layer, wherein the foam layer is interposed between the second surface of the polishing layer and the subpad.~~

96) A polishing pad comprising a polishing layer having a working surface and a second surface opposite the working surface;

wherein the working surface includes a land region and at least one of a plurality of precisely shaped pores and a plurality of precisely shaped asperities;

wherein the thickness of the land region is less than about 5 mm and the polishing layer comprises a polymer; and

wherein the working surface comprises a secondary surface layer and a bulk layer; and wherein at least one of the receding contact angle and advancing contact angle of the secondary surface layer is at least about 20° less than the corresponding receding contact angle or advancing contact angle of the bulk layer.

~~107) The polishing pad of claim 96, wherein the working surface includes a plurality of precisely shaped pores; and, optionally, wherein the depth of the plurality of precisely shaped pores is less than the thickness of the land region adjacent to each precisely shaped pore.~~

~~118) The polishing pad of claim 96, wherein the working surface includes a plurality of precisely shaped asperities.~~

~~129) The polishing pad of claim 96, wherein the chemical composition in at least a portion of the secondary surface layer differs from the chemical composition within the bulk layer; and wherein the chemical composition in at least a portion of the secondary surface layer, which differs from the chemical composition within the bulk layer, includes silicon.~~

~~1310) The polishing pad of claim 96, wherein the polishing layer is substantially free of inorganic abrasive particles.~~

~~14) The polishing pad of claim 9, wherein the polishing layer further comprises a plurality of independent or inter-connected macro-channels.~~

~~15) The polishing pad of claim 9, further comprising a subpad, wherein the subpad is adjacent to the second surface of the polishing layer.~~

~~16) The polishing pad of claim 9, further comprising a foam layer, wherein the foam layer is interposed between the second surface of the polishing layer and the subpad.~~

~~1711) A polishing pad comprising a polishing layer having a working surface and a second surface opposite the working surface;~~

~~wherein the working surface includes a land region and at least one of a plurality of precisely shaped pores and a plurality of precisely shaped asperities;~~

~~wherein the thickness of the land region is less than about 5 mm and the polishing layer comprises a polymer; and~~

~~wherein the working surface comprises a secondary surface layer and a bulk layer; and wherein the receding contact angle of the working surface is less than about 50°.~~

~~1812) The polishing pad of claim 1711, wherein the working surface includes a plurality of precisely shaped pores; and, optionally, wherein the depth of the plurality of precisely shaped pores is less than the thickness of the land region adjacent to each precisely shaped pore.~~

~~1913) The polishing pad of claim 1711, wherein the working surface includes a plurality of precisely shaped asperities.~~

~~2014) The polishing pad of claim 1711, wherein the receding contact angle of the working surface is less than about 30°.~~

~~2115) The polishing pad of claim 1711, wherein the polishing layer is substantially free of inorganic abrasive particles.~~

~~22) The polishing pad of claim 17, wherein the polishing layer further comprises a plurality of independent or inter-connected macro-channels.~~

~~23) The polishing pad of claim 17, further comprising a subpad, wherein the subpad is adjacent to the second surface of the polishing layer.~~

~~24) — The polishing pad of claim 17, further comprising a foam layer, wherein the foam layer is interposed between the second surface of the polishing layer and the subpad.~~

~~25) — The polishing pad of any one of claims 1, 9 and 17, further comprising:~~

~~i) at least one second polishing layer having a working surface and a second surface opposite the working surface, the second surface of the polishing layer being adjacent to the working surface of the at least one second polishing layer;~~

~~wherein the working surface includes a land region and at least one of a plurality of precisely shaped pores and a plurality of precisely shaped asperities,~~

~~wherein the thickness of the land region is less than about 5 mm and the polishing layer comprises a polymer; and~~

~~wherein the at least one second polishing layer includes a plurality of nanometer-size topographical features on at least one of the surface of the precisely shaped asperities, the surface of the precisely shaped pores and the surface of the land region, or~~

~~ii) at least one second polishing layer having a working surface and a second surface opposite the working surface, the second surface of the polishing layer being adjacent to the working surface of the at least one second polishing layer;~~

~~wherein the working surface includes a land region and at least one of a plurality of precisely shaped pores and a plurality of precisely shaped asperities,~~

~~wherein the thickness of the land region is less than about 5 mm and the polishing layer comprises a polymer; and~~

~~wherein the working surface of the at least one second polishing layer comprises a secondary surface layer and a bulk layer; and wherein at least one of the receding contact angle and advancing contact angle of the secondary surface layer is at least about 20° less than the corresponding receding contact angle or advancing contact angle of the bulk layer; or~~

~~iii) at least one second polishing layer having a working surface and a second surface opposite the working surface, the second surface of the polishing layer being adjacent to the working surface of the at least one second polishing layer;~~

~~wherein the working surface includes a land region and at least one of a plurality of precisely shaped pores and a plurality of precisely shaped asperities,~~

~~wherein the thickness of the land region is less than about 5 mm and the polishing layer comprises a polymer; and~~

~~wherein the working surface of the at least one second polishing layer comprises a secondary surface layer and a bulk layer; and wherein the receding contact angle of the working surface of the at least one second polishing layer is less than about 50°.~~

~~26) The polishing pad of claim 25, further comprising an adhesive layer disposed between the second surface of the polishing layer and the working surface of the at least one second polishing layer.~~

~~27) The polishing pad of claim 26, wherein the adhesive layer is a pressure-sensitive adhesive layer.~~

~~28) The polishing pad of claim 25, further comprising a foam layer disposed between the second surface of the polishing layer and the working surface of the at least one second polishing layer and a second foam layer adjacent the second surface of the at least one second polishing layer.~~

~~29) A polishing system comprising the polishing pad of anyone of claims 1, 9 and 17 and a polishing solution.~~

~~30) The polishing system of claim 29, wherein the polishing solution is a slurry.~~

~~31) The polishing system of claim 29, wherein the polishing layer contains less than 1% by volume inorganic abrasive particles.~~

3216) A method of polishing a substrate, the method comprising:

- providing a polishing pad according to any one of claims 1, 9 and 17;
- providing a substrate;
- contacting the working surface of the polishing pad with the substrate surface;
- moving the polishing pad and the substrate relative to one another while maintaining contact between the working surface of the polishing pad and the substrate surface; and
- wherein polishing is conducted in the presence of a polishing solution.

~~33) — The method of polishing a substrate of claim 32, wherein the substrate is a semiconductor wafer.~~

~~34) — The method of polishing a substrate of claim 33, wherein the semiconductor wafer surface in contact with the working surface of the polishing pad includes at least one of a dielectric material and an electrically conductive material.~~