WHAT IS CLAIMED IS:

1. A chemical mechanical polishing (CMP) conditioner comprising:

a ceramic substrate having a major surface, the major surface including micro-protrusions, at least a portion of the micro-protrusions being arranged in an irregular pattern, and wherein the irregular pattern has a minimum spacing between adjacent micro-protrusions; and

an abrasive coating overlying the major surface.

2. The CMP conditioner as recited in claim 1, wherein an additional portion of the micro-protrusions are arranged in a regular pattern.

3. The CMP conditioner as recited in claim 1 or 2, wherein the micro-protrusions are non-polygonal.

4. The CMP conditioner as recited in any one of claims 1 to 3, wherein the distance between each adjacent pair of micro-protrusions is substantially randomly distributed within the minimum spacing.

5. The CMP conditioner as recited in any one of the preceding claims, wherein a number of micro-protrusions per cm^2 on the major surface is substantially uniform.

6. A chemical mechanical polishing (CMP) conditioner comprising:

a ceramic substrate having a major surface, the major surface including micro-protrusions arranged in a pattern, wherein at least a portion of the micro-protrusions have a height of a trailing edge that is different from a height of a leading edge, the trailing edge and the leading edge at least partly defining a top surface of each respective micro-protrusion of the portion of micro-protrusions; and

an abrasive coating overlying the major surface.

7. The CMP conditioner as recited in claim 6, wherein the height of the leading edge is greater than the height of the trailing edge.

8. The CMP conditioner as recited in claim 6, wherein the height of the leading edge is less than the height of the trailing edge.

9. The CMP conditioner as recited in any one of the preceding claims, wherein the ceramic substrate includes Al_2O_3, SiC, WC, Si_3N_4, ZrO_2, Cr_2N_3, or any combination thereof.

10. The CMP conditioner as recited in any one of the preceding claims, wherein the abrasive coating has an average thickness of at least about 0.5 micron and no greater than about 15 microns.

11. The CMP conditioner as recited in any one of the preceding claims, wherein the thickness of the abrasive coating has a variation of no greater than about 15%.

12. The CMP conditioner as recited in any one of the preceding claims, wherein the CMP conditioner is free of an intermediate layer between the ceramic substrate and the abrasive coating.

13. A chemical mechanical polishing (CMP) conditioner comprising:

a substrate having a major surface, the major surface including micro-protrusions arranged in a pattern, wherein a first portion of the micro-protrusions have a first shape and a second portion of the micro-protrusions have a second shape that is different from the first shape; and

an abrasive coating overlying the major surface.

14. The CMP conditioner as recited in claim 13, wherein the substrate includes one or more materials selected from the following group: W, Mb, Zr, Cu, Ni, stainless steel.

15. The CMP conditioner as recited in any one of the preceding claims, wherein the micro-protrusions have a height of between about 1 micron to about 2000 microns, a width between about 1 micron to about 2000 microns, or both.

WHAT IS CLAIMED IS:

1. A chemical mechanical polishing (CMP) conditioner comprising:

a ceramic substrate having a major surface, the major surface including micro-protrusions, at least a portion of the micro-protrusions being arranged in an irregular pattern, wherein the irregular pattern has a minimum spacing between adjacent micro-protrusions wherein the distance between each adjacent pair of micro-protrusions is substantially randomly distributed within the minimum spacing; and

an abrasive coating overlying the major surface.

2. The CMP conditioner as recited in claim 1, wherein an additional portion of the micro-protrusions are arranged in a regular pattern.

3. The CMP conditioner as recited in claim 1, wherein the micro-protrusions are non-polygonal.

4. The CMP conditioner as recited in claim 1, wherein a number of micro-protrusions per cm^2 on the major surface is substantially uniform.

5. A chemical mechanical polishing (CMP) conditioner comprising:

a ceramic substrate having a major surface, the major surface including micro-protrusions arranged in a pattern, wherein at least a portion of the micro-protrusions have a height of a trailing edge that is different from a height of a leading edge, the trailing edge and the leading edge at least partly defining a top surface of each respective micro-protrusion of the portion of micro-protrusions; and

an abrasive coating overlying the major surface.

6. The CMP conditioner as recited in claim 5, wherein the height of the leading edge is greater than the height of the trailing edge.

7. The CMP conditioner as recited in claim 5, wherein the height of the leading edge is less than the height of the trailing edge.

8. The CMP conditioner as recited in claim 5, wherein the ceramic substrate includes Al_2O_3, SiC, WC, Si_3N_4, ZrO_2, Cr_2N_3, or any combination thereof.

9. The CMP conditioner as recited in claim 5, wherein the abrasive coating has an average thickness of at least about 0.5 microns and no greater than about 15 microns.

10. The CMP conditioner as recited in claim 5, wherein the thickness of the abrasive coating has a variation of no greater than about 15%.

11. The CMP conditioner as recited in claim 5, wherein the CMP conditioner is free of an intermediate layer between the ceramic substrate and the abrasive coating.

12. A chemical mechanical polishing (CMP) conditioner comprising:

a substrate having a major surface, the major surface including micro-protrusions arranged in a pattern, wherein a first portion of the micro-protrusions have a first shape and a second portion of the micro-protrusions have a second shape that is different from the first shape; and

an abrasive coating overlying the major surface.

13. The CMP conditioner as recited in claim 12, wherein the substrate includes one or more materials selected from the following group: W, Mb, Zr, Cu, Ni, stainless steel.

14. The CMP conditioner as recited in claim 12, wherein the micro-protrusions have a height between about 1 micron to about 2000 microns.

15. The CMP conditioner as recited in clam 12, wherein the micro-protrusions have a width between about 1 micron to about 2000 microns.