CLAIMS

What is claimed is:

1. A pad conditioner for a chemical mechanical planarization (CMP) assembly, comprising:

a substrate having a first surface and a second surface opposite the first surface; and

a plurality of protrusions protruding away from the first surface in a direction that is normal to the first surface, wherein the plurality of protrusions are arranged in a plurality of rows, and wherein the plurality of protrusions include one of conical and frustoconical,

wherein a first row of the plurality of rows is offset from a second row of the plurality of rows, wherein the offset is from 10° to 60°.

2. The pad conditioner of claim 1, wherein the plurality of protrusions include a uniform geometry.

3. The pad conditioner of claim 1, wherein the plurality of protrusions are uniformly spaced.

4. The pad conditioner of claim 1, wherein the plurality of protrusions are formed of a silicon carbide having a diamond coated cutting surface.

5. The pad conditioner of claim 1, wherein a density of the plurality of protrusions is from 0.10 per mm^2 to 25 per mm^2.

6. The pad conditioner of claim 1, wherein a protrusion distance from the substrate is from 15 μm to 100 μm.

7. A chemical mechanical planarization (CMP) pad conditioner assembly, comprising:

a backing plate having a first backing plate surface; and

a plurality of pad conditioners secured to the first backing plate surface, each of the plurality of pad conditioners comprising:

a substrate having a first surface and a second surface opposite the first surface; and

a plurality of protrusions protruding away from the first surface in a direction that is normal to the first surface, wherein the plurality of protrusions are arranged in a plurality of rows, and wherein the plurality of protrusions include one of conical and frustoconical,

wherein a first row of the plurality of rows is offset from a second row of the plurality of rows, wherein the offset is from 10° to 60°.

8. The assembly of claim 7, wherein the plurality of pad conditioners are spaced circumferentially about the backing plate.