CLAIMS:

1. A method for laser treating an electrostatic chuck pedestal, the method comprising:

selectively applying a laser beam to a substrate contact area of the electrostatic chuck pedestal to form a microstructurally modified layer on at least a portion of the substrate contact area.

2. The method of claim 1, wherein selectively applying the laser beam to the substrate contact area comprises selectively applying the laser beam in a presence of oxygen, and wherein the microstructurally modified layer includes an oxide layer.

3. The method of claim 2, wherein the oxide layer comprises one or more of aluminum oxide or aluminum oxynitride.

4. The method of claim 1, wherein the electrostatic chuck pedestal comprises aluminum nitride.

5. The method of claim 1, further comprising selectively applying the laser beam to the substrate contact area in the presence of a dopant to thereby incorporate the dopant into the microstructurally modified layer.

6. The method of claim 1, further comprising selectively applying the laser beam to the substrate contact area in a vacuum or in one or more of a hydrogen-enriched or a nitrogen-enriched atmosphere.

7. The method of claim 1, wherein the electrostatic chuck pedestal comprises a degraded electrostatic chuck pedestal.

8. The method of claim 1, wherein the microstructurally modified layer comprises a thickness of greater than or equal to 100 nm.

9. A method, comprising:

selectively applying a laser beam to at least a portion of a substrate-facing surface of an electrostatic chuck pedestal outside of one or more substrate contact areas of the substrate-facing surface of the electrostatic chuck pedestal to thereby form a microstructurally modified layer on at least the portion of the substrate-facing surface.

10. The method of claim 9, wherein selectively applying the laser beam to at least the portion of the substrate-facing surface comprises selectively applying the laser beam in a presence of oxygen, and wherein the microstructurally modified layer includes an oxide layer.

11. The method of claim 9, further comprising selectively applying the laser beam in the presence of a dopant to thereby incorporate the dopant into the microstructurally modified layer.

12. The method of claim 9, wherein the electrostatic chuck pedestal comprises aluminum nitride.

13. The method of claim 9, wherein the microstructurally modified layer comprises a thickness of greater than or equal to 100 nm.

14. An electrostatic chuck pedestal comprising:

a substrate-facing surface comprising a substrate contact area; and

a microstructurally modified layer on at least a portion of the substrate contact area, wherein the microstructurally modified layer comprises a thickness of greater than or equal to 100 nm.

15. The electrostatic chuck pedestal of claim 14, wherein the microstructurally modified layer comprises an oxide layer.