

CLAIMS

1. An electrostatic chuck, comprising:
 - a dielectric disk having a support surface to support a substrate and an opposing second surface, wherein at least one chucking electrode is disposed within the dielectric disk;
 - a radio frequency (RF) bias plate disposed below the dielectric disk;
 - a plurality of lamps disposed below the RF bias plate to heat the dielectric disk;
 - a metallic plate disposed below the plurality of lamps to absorb heat generated by the plurality of lamps;
 - a shaft coupled to the second surface of the dielectric disk at a first end of the shaft to support the dielectric disk in a spaced apart relation to the RF bias plate and extending away from the dielectric disk and through the RF bias plate and the metallic plate; and
 - a rotation assembly coupled to the shaft to rotate the shaft and the dielectric disk with respect to the RF bias plate, the plurality of lamps, and the metallic plate.
2. The electrostatic chuck of claim 1, wherein the electrostatic chuck is a bipolar electrostatic chuck.
3. The electrostatic chuck of claim 1, further comprising:
 - a housing containing the RF bias plate, the plurality of lamps, and the metallic plate.
4. The electrostatic chuck of claim 3, further comprising:
 - a gap disposed between an outer diameter of the metallic plate and an inner surface of the housing, wherein the gap is sized such that when the metallic plate absorbs heat from the plurality of lamps, thermal expansion of the metallic plate causes the outer diameter of the metallic plate to contact the inner surface of the housing.

5. The electrostatic chuck of claim 1, wherein the RF bias plate is disposed between the dielectric disk and the plurality of lamps.
6. The electrostatic chuck of claim 5, wherein the RF bias plate includes a plurality of openings to allow heat emitted from the plurality of lamps to heat the dielectric disk.
7. The electrostatic chuck of claim 1, wherein the plurality of lamps include halogen lamps.
8. The electrostatic chuck of claim 1, wherein the plurality of lamps include an inner array of lamps and an independently controllable outer array of lamps.
9. The electrostatic chuck of claim 1, wherein the rotation assembly is a magnetic rotation assembly.
10. The electrostatic chuck of claim 9, wherein the magnetic rotation assembly includes an inner magnet attached to a lower portion of the shaft proximate to a second end of the shaft opposite the first end and an outer magnet disposed about the inner magnet to drive the rotation of the inner magnet.
11. The electrostatic chuck of claim 1, further comprising:
a bearing assembly disposed about the shaft.
12. The electrostatic chuck of claim 11, wherein the bearing assembly is electrically coupled to the chucking electrode such that power can be fed through the bearing assembly to provide power to the at least one chucking electrode.
13. The electrostatic chuck of claim 1, further comprising:
an inductor filter disposed in a conductor coupled to the at least one chucking electrode to minimize RF interference with the at least one chucking electrode.

14. The electrostatic chuck of claim 1, further comprising:
a lift pin assembly including a plurality of lift pins movably disposed through the support surface of the dielectric disk.
15. The electrostatic chuck of claim 14, wherein at least one of the plurality of lift pins includes a pyrometer to measure a temperature of the dielectric disk.
16. The electrostatic chuck of claim 1, further comprising:
a bearing disposed about the shaft and proximate to the dielectric disk.
17. An electrostatic chuck, comprising:
a dielectric disk having a support surface to support a substrate and an opposing second surface, wherein at least one chucking electrode is disposed within the dielectric disk;
a radio frequency (RF) bias plate disposed below the dielectric disk;
an inductor filter disposed in a conductor coupled to the at least one chucking electrode to minimize RF interference with the at least one chucking electrode;
a plurality of lamps disposed below the RF bias plate to heat the dielectric disk;
a metallic plate disposed below the plurality of lamps to absorb heat generated by the plurality of lamps;
a shaft coupled to the second surface of the dielectric disk at a first end of the shaft to support the dielectric disk in a spaced apart relation to the RF bias plate and extending away from the dielectric disk and through the RF bias plate and the metallic plate; and
a magnetic rotation assembly coupled to the shaft to rotate the shaft and the dielectric disk with respect to the RF bias plate, the plurality of lamps, and the metallic plate, wherein the magnetic rotation assembly includes an inner magnet attached to a lower portion of the shaft proximate to a second end of the shaft opposite the first end and an outer magnet disposed about the inner magnet to drive the rotation of the inner magnet.

18. The electrostatic chuck of claim 17, further comprising:
a housing containing the RF bias plate, the plurality of lamps, and the metallic plate; and
a gap disposed between an outer diameter of the metallic plate and an inner surface of the housing, wherein the gap is sized such that when the metallic plate absorbs heat from the plurality of lamps, thermal expansion of the metallic plate causes the outer diameter of the metallic plate to contact the inner surface of the housing.
19. The electrostatic chuck of claim 17, further comprising:
a DC power source coupled to the chucking electrode; and
an RF power source coupled to the RF bias plate.
20. An electrostatic chuck, comprising:
a dielectric disk having a support surface to support a substrate and an opposing second surface, wherein at least one chucking electrode is disposed within the dielectric disk;
a radio frequency (RF) bias plate disposed below the dielectric disk;
a plurality of lamps disposed below the RF bias plate to heat the dielectric disk;
a metallic plate disposed below the plurality of lamps to absorb heat generated by the plurality of lamps;
a housing containing the RF bias plate, the plurality of lamps, and the metallic plate;
a gap disposed between an outer diameter of the metallic plate and an inner surface of the housing, wherein the gap is sized such that when the metallic plate absorbs heat from the plurality of lamps, thermal expansion of the metallic plate causes the outer diameter of the metallic plate to contact the inner surface of the housing;
a shaft coupled to the second surface of the dielectric disk at a first end of the shaft to support the dielectric disk in a spaced apart relation to the RF bias plate and extending away from the dielectric disk and through the RF bias plate and the metallic plate; and

a magnetic rotation assembly coupled to the shaft to rotate the shaft and the dielectric disk with respect to the RF bias plate, the plurality of lamps, and the metallic plate.