CLAIMS

1. A capacitively-coupled plasma (CCP) processing system having a plasma processing chamber capable of both CCP processing and inductively coupled plasma processing for processing a substrate, comprising:

at least an upper electrode and a lower electrode for processing said substrate, said substrate being disposed on said lower electrode during plasma processing; wherein the upper electrode has at least one slit extending through the upper electrode; and

an array of inductor coils arrangement having a plurality of inductor coils, said array of inductor coils arrangement being disposed above and in contact with said upper electrode, said array of inductor coils arrangement configured to inductively sustain plasma in a gap between said upper electrode and said lower electrode, wherein individual ones of at least a subset of said plurality of inductor coils are independently controllable with respect to at least one of phase and RF power, wherein said array of inductor coils arrangement includes at least

a set of magnetic cores, wherein each magnetic core is a single unitary magnetic core,

and

a set of coils, each single unitary magnetic core is wound with a coil of said set of coils, wherein a first magnetic core in said set of magnetic cores is separated from an adjacent magnetic core by a distance of about 25 percent to 100 percent of said gap between said upper electrode and said lower electrode.

2. The CCP processing system of claim 1 further comprising at least one radio frequency (RF) power source, said RF power source being configured to capacitively ignite and sustain plasma between said upper electrode and said lower electrode.

3. The CCP processing system of claim 2, wherein said RF power source has an RF frequency of at least one of about 2 MHz, about 27 MHz, and about 60 MHz.

~~4. The CCP processing system of claim 1, wherein said array of inductor coils arrangement includes at least~~

~~A set of magnetic cores and~~

~~A set of coils, each coil of said set of coils is wound around each magnetic core of said set of magnetic cores.~~

~~5~~4. The CCP processing system of claim ~~4~~1, wherein said each magnetic core of said set of magnetic cores is a bobbin, said bobbin in a set of bobbins is magnetically coupled by a set of magnetic connectors so that a magnetic field of each said bobbin in said set of bobbins couples with any opposing magnetic poleof adjacent ones of said set of bobbins.~~.~~

~~6~~5. The CCP processing system of claim ~~5~~4, wherein said set of magnetic connectors is disposed on said set of magnetic cores to complete magnetic circuits for adjacent pairs of bobbins.

~~7~~6. The CCP processing system of claim ~~5~~4, wherein a first bobbin in said set of bobbins is arranged in alternating, opposing magnetic pole to an adjacent bobbin.

~~8~~7. The CCP processing system of claim ~~5~~4, wherein said set of connectors is at least one of a set
of magnetic straps and a magnetic plate.

~~9~~8. The CCP processing system of claim ~~4~~1, wherein said each magnetic core of said set of magnetic cores ~~is a magnetic material, said magnetic material is made of at least one of ferrite and powder iron.~~is a horseshoe magnet.

~~10~~9. The CCP processing system of claim ~~5~~1, wherein each magnetic ~~connector~~ core of said set of magnetic ~~connectors~~ cores is a magnetic material, said magnetic material is made of at least one of ferrite and powder iron.

~~11~~10. The CCP processing system of claim 4, wherein ~~a first~~each magnetic ~~core~~ connector ~~in~~ of said set of magnetic ~~cores~~ connector is ~~separated from an adjacent magnetic core by a distance of about 25 percent to 100 percent of said gap between~~

~~said upper electrode and said lower electrode~~electrode magnetic material, said magnetic material is made of at least one of ferrite and powder iron.

~~12. The CCP processing system of claim 4, wherein said each coil of said set of coils in said arrat of inductor coils arrangement is remoted from said upper electrode.~~

~~13. The CCP processing system of claim 1, wherein said upper electrode is configure with an electrostatic shield.~~

~~14~~11. The CCP processing system of claim 1, wherein ~~inductor coils in said array of inductor coils arrangement are arranged in a predetermined pattern.~~said upper electrode is configured with an electrostatic shield having slits all the way through the surface of the upper electrode generally radial to said inductor coils.

~~15~~12. The CCP processing system of claim ~~8~~1, wherein ~~said at least one of a set of magnetic straps is formed iof at least one of ferrite and powder ion.~~ inductor coils in said array of inductor coils arrangement are arranged in a self- similar pattern.

~~16~~13. The CCP processing system of claim 1, wherein said ~~upper electrode is counter-bored to at least partially bury said individual ones of at least a subset of said plurality of inductor coils in said upper electrode.~~inductor coils in said array of inductor coils arrangement are arranged in a predetermined pattern.

~~17. The CCP processing system of claim 1, wherein inductor coils in said array of inductor coils arrangement are arranged in an alternating concentric ring pattern.~~

~~18. A plasma processing system having a plasma processing chamber for processing a substrate, comprising:~~

~~at least an upper electrode and a lower electrode for processing said substrate, said substrate being disposed on said lower electrode during plasma processing; and~~

~~an array of inductor coils arrangement having a plurality of inductor coils, said array of inductor coils arrangement being disposed above said upper electrode, said array of inductor coils arrangement employing magnetic core material that is other than air and configured to inductively sustain plasma in a gap between said upper~~

~~electrode and said lower electrode, wherein individual ones of at least a subset of said plurality of inductor coils are independently controllable with respect to at least one of phase and RF power and wherein magnetic cores of adjacent ones of said a subset of said plurality of inductor coils are arranged in an alternating pole configuration.~~

~~19. The plasma processing system of claim 18 wherein said magnetic core material is formed from ferrite.~~

~~20. The plasma processing system of claim 18, wherein said magnetic core material is formed from powder iron.~~

~~21~~14. The plasma processing system of claim ~~18~~7, wherein ~~a first magnetic core in said magnetic cores is separated from an adjacent magnetic core of said magnetic cores that is adjacent to said first magnetic core by a distance of about 25 percent to 100 percent of said gap between upper electrode and said lower electrode.~~ said set of magnetic connectors includes at least said set of magnetic straps formed of at least one of ferrite and powder iron.

15. The CCP processing system of claim 1, wherein said upper electrode is counter-bored to at least partially bury said individual ones of at least a subset of said plurality of inductor coils in said upper electrode.

16. The CCP processing system of claim 1, wherein inductor coils in said array of inductor coils arrangement are arranged in an alternating concentric ring pattern.

17. A plasma processing system having a plasma processing chamber capable of both CCP processing and inductively-coupled plasma processing for processing a substrate, comprising:

at least an upper electrode and a lower electrode for processing said substrate, said substrate being disposed on said lower electrode during plasma processing, wherein the upper electrode has at least one slit extending through the upper electrode; and

an array of inductor coils arrangement having a plurality of inductor coils, said array of inductor coils arrangement being disposed above and in

contact with said upper electrode, each inductor coil of said array of inductor coils arrangement employing a single unitary magnetic core of magnetic material and configured to inductively sustain plasma in a gap between said upper electrode and said lower electrode, wherein individual ones of at least a subset of said plurality of inductor coils are independently controllable with respect to and between phase and RF power and wherein magnetic cores of adjacent ones of said a subset of said plurality of inductor coils are arranged in an alternating pole configuration, wherein a first magnetic core in said magnetic cores is separated from an adjacent magnetic core of said magnetic cores that is adjacent to said first magnetic core by a distance of about 25 percent to 100 percent of said gap between said upper electrode and said lower electrode.

18. The plasma processing system of claim 17 wherein said magnetic core material is formed from ferrite.

19. The plasma processing system of claim 17, wherein said magnetic core material is formed from powder iron.