

CLAIMS

1. A microwave magnetron, comprising:
 - a cathode for emitting electrons;
 - a filament for receiving a filament current to heat the cathode to enable to cathode to emit the electrons;
 - an anode to which anodic power can be applied to affect a flow of the electrons;
 - an anodic power input for receiving the anodic power to be applied to the anode, the anodic power being characterized by an anodic current, an anodic voltage, and an anodic impedance, the anodic impedance being a quotient of the anodic voltage and the anodic current;
 - an electromagnet for providing a magnetic field in which the electrons flow;
 - an electromagnet power input for receiving electromagnet power and applying the electromagnet power to the electromagnet for controlling an intensity of the magnetic field, the electromagnet power being characterized by an electromagnet current; and
 - a controller for controlling parameters of the microwave magnetron, the controller adjusting at least one of the parameters of the magnetron to affect the flow of electrons while maintaining the anodic impedance constant.
2. The microwave magnetron of claim 1, wherein the parameters of the microwave magnetron controlled by the controller comprise the anodic current, the filament current, and the electromagnet current.
3. The microwave magnetron of claim 1, wherein the controller monitors the parameters of the microwave magnetron.
4. The microwave magnetron of claim 3, wherein the controller is adapted to issue an alarm based on at least one of the monitored parameters of the microwave magnetron.
5. The microwave magnetron of claim 1, wherein the controller monitors the anodic voltage.

6. The microwave magnetron of claim 3, wherein the controller is adapted to issue an alarm based on the monitored anodic voltage.
7. The microwave magnetron of claim 1, further comprising a filament control module between the controller and the filament, the filament control module generating a filament current monitoring signal and forwarding the filament current monitoring signal to the controller, and the filament control module receiving a filament current setting signal from the controller.
8. The microwave magnetron of claim 7, further comprising a filament transformer between the filament control module and the filament.
9. The microwave magnetron of claim 1, further comprising an electromagnet control module between the controller and the electromagnet, the electromagnet control module generating an electromagnet current monitoring signal and forwarding the electromagnet current monitoring signal to the controller, and the electromagnet control module receiving an electromagnet current setting signal from the controller.
10. The microwave magnetron of claim 1, further comprising a microwave output for providing output microwave energy out of the microwave magnetron.
11. The microwave magnetron of claim 10, wherein the microwave output is connectable to a system for processing a substrate.
12. The microwave magnetron of claim 12, wherein the system is a plasma generation system.
13. The microwave magnetron of claim 12, wherein the system is a chemical vapor deposition (CVD) system.
14. The microwave magnetron of claim 12, wherein the system is a synthetic diamond growth chemical vapor deposition (CVD) system.