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Carbon Pulsed Evaporator for Carbon Plasma Source

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Carbon plasma source has been developed. The application of the carbon source is carbon material deposition. Hydrocarbon gas and hydrogen gas are generally used for the carbon material deposition. In this case, main plasma component is hydrogen and hydrocarbon. Carbon is not main component of the plasma. The carbon plasma source can provide carbon gas. In my device, carbon can be the main component of the plasma. The carbon evaporator is operated independently with the back-ground gas. Hydrogen can be mixed with the carbon gas. This device can be operated under two component gas, hydrogen and carbon without any hydrocarbon gas. This device will provide a new parameter area for carbon material deposition.
The solid carbon material is used for the particle source. Capacitor bank feeds the Mega-watt class electrical power into the carbon plasma source. The carbon is heated and is evaporated in mili-seconds, and the evaporated gas flow is diffused in several seconds. The carbon gas pressure is maintained by the repetitive operations and controlled by the charging voltage of the capacitor bank and the repetition interval. The carbon plasma source is coaxial shape, and consisted with center carbon electrode and with outer carbon pipe. The center carbon electrode is terminated with outer carbon pipe by carbon plate. The evaporated carbon particles flow in the plasma chamber with multi-cusp magnetic fields.
Order of 10-4 Torr of carbon pressure is obtained in the cusp field chamber. These microwave powers are escalated in the test phase. The carbon pulsed evaporator is used for pure carbon plasma and for two-component plasma with hydrogen. The carbon gas pressure control and the hydrogen gas pressure control provide new parameter region for carbon material deposition.

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