

**[P-06]**

## Plasma Source Ion Implantation using High Power Pulsed RF Plasma

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In plasma source ion implantation of molecular gases such as nitrogen, oxygen, etc., the ratio of atomic and molecular ionic species is very important from the standpoint of implanted ion energy. Hence, it is very beneficial to produce more atomic ion species than molecular ones to achieve deep implantation profiles. The high RF power has been known to be an efficient way to produce atomic ion species along with high ionization rate of molecular gases.

A large-scale plasma source ion implantation system has been built, for which a high-power pulsed RF generator and a water-cooled internal antenna were used to produce high-density inductively coupled RF plasma. The pulsed RF generator aiming the higher generation rate of atomic ion species, was constructed based on a 4CX5000A RF tetrode and turned out to give output power of up to 50 kW PEP and 3 kW average at 13.56 MHz. Besides, a high voltage pulse modulator using parallel vacuum switch tubes has been built to perform plasma source ion implantation at 100 kV and 30 A.

In this talk, various results of plasma source ion implantation experiments, especially atomic oxygen or nitrogen implantation performed using the high-power pulsed RF plasma will be shown and discussed in detail.