

2.45 GHz Microwave Plasma Source μ SLAN



Fig. 1: μ SLAN

Deposition of SiN_x Thin Film Using μ -SLAN Surface Wave Plasma Source

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The work described below was performed using a PlasmaConsult SLAN-I-DS microwave plasma source.

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Deposition of SiN_x Thin Film Using μ -SLAN Surface

Wave Plasma Source

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Abstract

A slot antenna (μ -SLAN) microwave surface wave plasma source was developed for SiN_x thin film preparation. A μ -SLAN-produced argon plasma density up to 10^{11} cm^{-3} has been achieved at an axial position of about 43 cm from the ring cavity at a microwave power of 500 W and a chamber pressure of 0.5 Torr. High-speed deposition of SiN_x thin film was performed using the μ -SLAN-assisted remote plasma enhanced chemical vapor deposition method incorporating tris(dimethylamino)silane (TDMAS) as a monomer source. The film deposition rate increased rapidly up to 270 nm/min when some hydrogen was mixed in the nitrogen gas and increased from 0 to 1%. A further increase of hydrogen content, however, only slightly increased the film deposition rate. A high deposition rate of 280 nm/min was obtained when 15% hydrogen was mixed in the nitrogen gas, with the chamber pressure and microwave power at 1.5 Torr and 500 W, respectively.

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