
Microwave plasma sources based on microstrip line for material processing

Jaeho Kim ¹ and Hajime Sakakita ¹

¹Innovative Plasma Processing Group, Electronics and Photonics Research Institute & GaN Advanced Device Open Innovation Laboratory (GaN-OIL), National Institute of Advanced Industrial Science and Technology (AIST), Japan

Recently, the development of advanced materials-processing has been strongly demanded to support the next generation of electronic and optoelectronic devices. Since low-pressure plasmas can provide low-temperature and large-area processes, they have been widely used so far in electronic industries. However, the low-pressure plasmas have several limitations such as the low density of radicals, the high ion bombardment into substrates, and the need of a high-vacuum reactor as a plasma source.

In this talk, we report new plasma technology that is capable of providing low-temperature and large-area processing methods in a wide range of gas pressures from 1 torr to atmospheric pressure. In the plasma technology, specially-designed microwave plasma sources based on microstrip line instead of conventional lumped waveguide are used. We have applied the plasma sources to develop advanced materials-processing methods for atmospheric-pressure plasma treatment, deposition of carbon nanomaterials, plasma nitriding of metal surfaces, deposition of GaN and so on.