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Ultraviolet Light Source Using Electrodeless Microwave Discharge TAKU NISHIKAWA, Nagoya Univ., HIROTAKA TOYODA, Nagoya Univ., PLANT, Nagoya Univ. — Surface treatment technologies using ultraviolet (UV) light, such as organic residue removal, surface modification or sterilization, are widely used. So far, UV lamps using DC discharge with electrodes inside the lamp tube is commonly used. However, sputtering of electrode materials sometimes causes deposition on the inner tube surface as well as degradation of the electrodes, resulting in short life time of the lamp tube. In this study, we propose an electrodeless UV mercury (Hg) lamp source using microwave power. 2.45 GHz Microwave power (<4 kW) from a power supply is divided into four power lines using branch waveguides. A mercury lamp tube (diameter: 9.6 mm, length: 42 cm, Hg: 13.5 mg, Ar: 1 Torr) is inserted into the branch waveguides and microwave power is coupled to the plasma. Emission from the lamp is monitored by a monochromator and an 254 nm UV monitor. Lamp temperature is also measured by a thermography camera and tube temperature up to 900 K with good uniformity along $\sim$ 30 cm was observed. Uniformity of the 254 nm UV light intensity was +15 % along the lamp tube. The maximum UV light intensity of 64 mW/cm^2 was observed at a microwave power of 4 kW.

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