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Spectroscopic Studies of Electrodeless Discharges

Takenaru AINAI*

Electrodeless discharges are examined spectroscopically.

Discharge bulbs made of glass have a dimension of 10 mm in diameter and of 0.1 mm in thickness and they contain Ar at the pressure of 1 Torr. and 4.5 Torr. Bulb is coupled inductively to the tank coil of the oscillator operating at 145 MHz.

Spectral lines are observed between 3,000 and 5,000 Å. No metastable or long life line is found.

Relaxation time for each line is obtained through the monochrometer and is detected by photomultiplier. Decay time is roughly proportional to wave length and pressure of the gas and is 10~30 μ s.

For small power electrodeless discharges, tank coil configurations play an important role at the start of discharge, so four kinds of coils are made and discharge state is observed. From the observed results, it is predicted that configurations take a great part in intensity distributions of radiation lines over the bulb.

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