

A technique based on a C-R model to determine electron density in low pressure discharges containing argon

Xi-Ming Zhu and Yi-Kang Pu

Tsinghua University

In this work, we will present results on electron density measurement in low pressure discharges containing argon over a wide pressure range. We will show that, by employing a simple collisional-radiative (CR) model involving high-lying (3p and 4p) excited levels in argon discharges, a relationship between the electron density and the line ratio is obtained. Using this relationship and by selecting a proper pair of excited levels, one can determine electron density without the knowledge of the value of electron temperature. The electron density from the simple CR model in an argon ICP are compared with the Langmuir probe measurements. The application and limitation of the model in discharges containing argon and other kinds of gases will also be discussed.