



## **Diagnosis of electron density in RF inductively coupled Ar/O<sub>2</sub> plasma by terahertz time domain spectroscopy**

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### Abstract

Adding an electronegative gas to an inert gas is one of the powerful ways to regulate plasma parameters, however, it poses a challenge in the high-density plasmas diagnostic due to the presence of negative ions. In this work, Terahertz time domain spectroscopy (THz-TDS) was adopted to diagnose electron density of Ar/O<sub>2</sub> inductively coupled plasma (ICP), and the influence of the discharge power, gas pressure and the oxygen mole ratio on the electron density evolution trend was researched. Furthermore, a fluid model was carried out to simulate the discharge parameters, and the result indicates that the simulated electron density are in qualitative agreement with the measured results for different power, pressure and oxygen mole ratios, indicating the huge application potential of THz-TDS in plasma diagnosis.

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