

179>

Accession number:20114414469264

Title:Electron density measurement of inductively coupled plasmas by terahertz time-domain spectroscopy (THz-TDS)

Authors:Ando, Ayumi (1); Kurose, Tomoko (1); Reymond, Vivien (1); Kitano, Katsuhisa (1); Kitahara, Hideaki (3); Takano, Keisuke (3); Tani, Masahiko (4); Hangyo, Masanori (3); Hamaguchi, Satoshi (1)

Author affiliation:(1) Center for Atomic and Molecular Technologies, Osaka University, 2-1 Yamadaoka, Suita, Osaka 565-0871, Japan; (2) ENSPS, Universite de Strasboug, Boulevard Sébastien Brant BP10413, 67412 Illkirch Cedex, France; (3) Institute of Laser Engineering, Osaka University, 2-6 Yamadaoka, Suita, Osaka 565-0871, Japan; (4) Resarch Center for Development of Far-Infrared Region, University of Fukui, 3-9-1 Bunkyo, Fukui City, Fukui Prefecture 910-8507, Japan

Corresponding author:Ando, A.

Source title:Journal of Applied Physics

Abbreviated source title:J Appl Phys

Volume:110

Issue:7

Issue date:October 1, 2011

Publication year:2011

Article number:073303

Language:English

ISSN:00218979

CODEN:JAPIAU

Document type:Journal article (JA)

Publisher:American Institute of Physics, 2 Huntington Quadrangle, Suite N101, Melville, NY 11747-4502, United States

Abstract:The electron densities of argon inductively coupled plasmas were measured by terahertz time-domain spectroscopy (THz-TDS). At a low pressure, the electron densities were also measured with a Langmuir-type double probe and the validity of THz-TDS electron-density measurement in a plasma has been corroborated. As the input radio-frequency (RF) power increases, the plasma density and gas temperature increase, which makes the probe measurement less reliable or even impossible, due to the large heat load to the probe surface. On the contrary, the THz-TDS measurement is unaffected by the gas temperature and becomes more reliable due to the higher electron density at higher input power for plasma generation.

Number of references:12