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Multiple diagnostics of a large-area very-high frequency capacitively coupled oxygen discharge¹ ZI-XUAN SU, DAO-MAN HAN, YONG-XIN LIU, YOU-NIAN WANG, Dalian University of Technology — The large-area very-high-frequency capacitively coupled plasmas, as a powerful tool for materials processing, has been widely used in semiconductor industry. Though a higher driving frequency and a larger electrode area can significantly improve output, accompanied electromagnetic effects have been the limitation for plasma material processing uniformity. In our work, the effect of electromagnetic effects on capacitively coupled oxygen discharge has been studied in a large-area cylindrical reactor driven with different very high frequencies. A fiber Bragg grating probe, a floating double probe and a hairpin probe were employed to measure the radial profiles of neutral gas temperature, relative O_2^+ ion density and electron density, respectively. Through the comprehensive diagnostics, the influences of the pressure and RF power on the plasma uniformity and some important plasma parameters were compared at various external control parameters.

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