

Influence of Ne–Xe Gas Mixture Ratio on the Extreme Ultraviolet (EUV) Emission Measurement from the Coaxially Focused Plasma

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The Ne-Xe plasmas in dense plasma-focus device with coaxial electrodes were generated for extreme ultraviolet (EUV) lithography. The influence of gas mixture ratio, Ne-Xe (1, 10, 15, 20, 25, 30, 50%) mixture gas, on EUV emission measurement, EUV intensity and electron temperature in the coaxially focused plasma were investigated. An input voltage of 4.5 kV was applied to the capacitor bank of 1.53mF and the diode chamber was filled with Ne-Xe mixture gas at a prescribed pressure. The inner surface of the cylindrical cathode was lined by an acetal insulator. The anode was made of tin metal. The EUV emission signal of the wavelength in the range of 6~16 nm has been detected by a photo-detector (AXUV-100 Zr/C, IRD). The visible emission line was also detected by the composite-grating spectrometer of the working wavelength range of 200~1100 nm (HR 4000CG). The electron temperature is obtained by the optical emission spectroscopy (OES) and measured by the Boltzmann plot with the assumption of local thermodynamic equilibrium (LTE).

Keywords: Ne-Xe plasmas, plasma-focus device, extreme ultraviolet (EUV), electron temperature measurement