Abstract Submitted
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Studies on the radical species in inductively coupled Ar/CH4 plasma using improved single Langmuir probe diagnostic methods and fluid simulation JU-HONG CHA, KWON-SANG SEO, JUNG YEOL LEE, HAE JUNE LEE, HO-JUN LEE, Department of Electrical Engineering,Pusan National University, Busan, South Korea — An inductively coupled plasma source driven by 13.56MHz was prepared for the deposition of a-C:H thin film. Properties of the plasma source are investigated by fluid simulation including Navier-Stokes equation and home-made tuned single Langmuir probe. Signal attenuation ratios of the Langmuir probe at first and second harmonic frequency were 49dB and 46dB respectively. Numerical methods including fitting, digital smoothing, digital filter with window function were used to calculate the electron energy distribution accurately. Dependencies of plasma parameters on process were well agreed with simulation results. It was found that RF power, inlet pressure and composition ratio significantly affect to the electron density, temperature and energy distribution. Electron density and plasma potential profile were changed along the input power and gas pressure. Below the input power density of 0.1W/cm3, higher plasma potential was observed at higher pressure. However, over the 0.1W/cm3, lower plasma potential was observed along the higher pressure. This result was occurred owing to the change of electron energy distribution. And from the simulation results, the specific chemical reaction channel, not CxHy but CHx, affect to the radical density profile.

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