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A COMPARISON BETWEEN THREE DIFFERENT ELECTRODE CONFIGURATIONS IN AN ARGON RF PLASMA

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Abstract

Theoretical consideration of the abnormal negative glow region will be introduced for three different schematics plasma reactors : - One Mesh System Electrodes (OMSE), One Mesh and Three System Electrodes (OMTSE) and Two Mesh System Electrodes (TMSE). The systems were operated using Ultra Low Frequency (ULF) RF source of one KHz frequency, 50-100 mA current and few hundreds volts at gas pressure of 1 mbar. A steady and uniform plasma was generated to get the electric characteristics of the different reactors for dry plasma using Ar, e.g. the current- voltage characteristics, the current density and the optimum distance for the best place of the treated samples over the mesh cathode without damage were investigated. For (OMSE) the d_N was about 0.24 – 0.325 cm, 0.25-0.39 cm for (OMTSE), and 0.35-0.54 cm for (TMSE). A comparison between the theoretical and the experimental results for the three reactors, using Ar at 1mbar, were also discussed where the experimental data for OMSE agree fairly with the theoretical relations more than TMSE or OMTSE.

Keywords: dry Argon RF plasma - Ultra Low Frequency plasma-cold plasma -abnormal negative glow- different plasma reactors