replacing GEC16-2016-020011.

Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

An analytical model of multi-component single frequency capacitively coupled plasma and experimental validation[1] PARTHA SAIKIA, HEMAN BHUYAN, MARIO FAVRE, EDMUND WYNDHAM, FELIPE VELOSO, Facultad Fisica, Pontificia Universidad Catolica de Chile, Ave. Vicua Mackena 4860, Santiago 22, Chile — An analytical model describing the hydrogen added argon capacitively coupled plasma (CPP) is pesented and its predictions are tested with the experimental results. In the analytical model, it is found that the radio frequency (rf) current density, electron temperature and density, as well as the density of ion in multi-component plasma collectively influence the normalized sheath potential and thickness. As for low pressure rf plasma, the sheath potential is the qualitative measure of the DC self bias, the trend of variation of DC self bias with hydrogen addition is predicted in this model. The behavior of single frequency multi-component CPP is experimentally studied by a homogeneous discharge model using discharge parameters. In the experiment with hydrogen added argon plasma, the rf power as well as the working pressures are varied. The addition of hydrogen to the argon discharge leads to a decrease of electron density and DC self bias. It also results an increase of electron temperature. Agreements of the experimental results with theoretical predictions are obtained at different experimental conditions.

[1]Authors acknowledge FONDECYT grant 3160179 and 1130228.

Partha Saikia
Facultad Fisica, Pontificia Universidad Catolica de Chile, Ave. Vicua Mackena 4860, Santiago 22, Chile

Date submitted: 09 Aug 2016 Electronic form version 1.4