

## Abstract

Simulation and modeling is vitally important to optimize the plasma controlling parameters and to understand the physics of plasma species. PLASIMO (*PLAsma Simulation MOdel*) is a valuable modeling toolkit to construct a grand physical module to simulate the plasma species in wide range of operating parameters along with different geometries of the reactors. In current study, the behavior of plasma species is observed under the optimal conditions of discharge in a mixture of Helium-Argon (He-Ar) gas in sputtering Hollow Cathode Discharge (HCD). HCD has a broad range of applications in different fields of studies. The optimal parameters that are used in this study have already been exercised in experimental and theoretical studies. Different concentrations of Ar (.1%, 1%, 2%, 5%, 7% and 10%) with He are utilized to investigate the behavior of plasma species on sputtering phenomenon. Electrodes are considered to be made of Cu. The results indicated that the increase in the concentration of the Ar in He-Ar gas mixture will lead to increase the density of the Cu atoms and ions. But with the increase in the concentration of Ar, the inhomogeneity in axial profile of densities will also increase which will leads to inactive some part of the HCD and the intensity of the Cu will be decrease. These results were validated by comparison with the previous experimental studies which showed a good level of accuracy.