

Abstract Submitted
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DSMC Simulation of Collision Process in Argon-Nitrogen Mixed Gaseous Thermal Plasma. SAHADEV PRADHAN, Chemical Technology Division, Bhabha Atomic Research Centre, Mumbai-400085, India — The collision process in Argon-Nitrogen mixed gaseous thermal plasma consist of electrons and heavy particles is studied using Direct Simulation Monte Carlo (DSMC) simulations to understand the effect of large mass ratio (electron and heavy particles) on collision rate when each species specified as a separate collision group as well as all the species in a single group for number of simulated particles per cell (F_N) in the range $2 < F_N < 200$, with eight sub-cells per cell. By including the separate collision group for each species the collision rates between heavy particles as well as among electrons and heavy particles with $F_N = 200$ and 20 are in excellent agreement with the theoretical value, to within 5%. However, the mean spacing between collision pair is increased and the selection is forced beyond the sub-cell. This also leads to an increase in the overall acceptance rate of collision pairs The comparison reveals that the inclusion of all the species in a single group become overwhelming when electrons are present. The very low F_N value($F_N = 2$) results in an excessive increase in mean spacing between collision pairs, and the error in the collision rate turn out to be very significant -/a

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