

Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Role of keV electrons in atmospheric pressure transient nanosecond-pulsed plasmas SANJANA KERKETTA, MARTIN GUNDERSEN, University of Southern California — Nanosecond pulsed plasmas have demonstrated high energy efficiencies and low energy costs for applications including the treatment of combustion exhaust and plasma assisted ignition. The reason behind this increased effectiveness is not well understood due to incomplete knowledge of electron-molecule dynamics at microscopic scales and during sub-nanosecond time intervals. We hypothesize that the presence of high energy electrons ($>keV$) for a brief time (nanoseconds) is one of the probable reasons for the high radical populations which can lead to different combustion chemistry. A mechanism involving thermo-field emission processes from surface macro and micro irregularities is considered for the generation of keV electrons. A simulation code employing Monte Carlo collision algorithm is developed to compare differences in electron trajectories and radical populations in the gas medium. It is concluded that high energy electrons alter radical production rates significantly and deserve study for understanding of the high efficiencies observed in transient plasma applications.

Sanjana Kerketta
University of Southern California

Date submitted: 05 Sep 2018

Electronic form version 1.4