Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Uncertainty propagation in modeling of plasma-assisted hydrogen production from biogas SHADI ZAHERISARABI, AYYASWAMY VENKATTRAMAN, Univ of California - Merced — With the growing concern of global warming and the resulting emphasis on decreasing greenhouse gas emissions, there is an ever-increasing need to utilize energy-production strategies that can decrease the burning of fossil fuels. In this context, hydrogen remains an attractive clean-energy fuel that can be oxidized to produce water as a by-product. In spite of being an abundant species, hydrogen is seldom found in a form that is directly usable for energy-production. While steam reforming of methane is one popular technique for hydrogen production, plasma-assisted conversion of biogas (carbon dioxide + methane) to hydrogen is an attractive alternative. Apart from producing hydrogen, the other advantage of using biogas as raw material is the fact that two potent greenhouse gases are consumed. In this regard, modeling is an important tool to understand and optimize plasma-assisted conversion of biogas. The primary goal of this work is to perform a comprehensive statistical study that quantifies the influence of uncertain rate constants thereby determining the key reaction pathways. A 0-D chemical kinetics solver in the OpenFOAM suite is used to perform a series of simulations to propagate the uncertainty in rate constants and the resulting mean and standard deviation of outcomes.

Shadi Zaherisarabi
Univ of California - Merced

Date submitted: 15 Jul 2016 Electronic form version 1.4