Keep-in-Touch meeting
(July 15, 2022)

Comparison of numerical and experimental results for validation of a kinetic scheme for CO_2-CH_4 plasmas

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The Dry Reforming of Methane (DRM) assisted by plasma, which aims at transforming CO2 and CH4 into value-added products (like CO and H2), has known a spike of interest over the last decade because of its potential to create high energy-density molecules. Though a vast literature is available for both pure CO2 plasmas and pure CH4 plasmas, the understanding of the base mechanisms controlling CO2 - CH4 plasmas is still challenging because of the large number of species and possible reaction pathways. This work comparing experimental and numerical data aims at providing insights into the key processes of CO2 - CH4 plasmas

To this aim, a kinetic scheme for LoKI is developed, including only molecules with up to one carbon atom to avoid resorting to the complex chemistry of C_2H_Y molecules. The numerical results are compared with experimental measurements taken at the output of a glow discharge at low pressure. Fourier Transform InfraRed (FTIR) spectroscopy and emission spectroscopy are used to measure important quantities of the discharge such as the temperature and the density of IR active species. The mechanisms leading to the production of the main products (H2, CO and H2O) are discussed. The role of excited states (such as O(1D)) is highlighted as it is avoiding resorting to more complex chemistry.