Spectroscopic diagnostic of argon rotating gliding discharges

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The use of plasma-mediated processing in various novel applications is growing significantly. It is because plasmas can provide a unique environment composed of neutral atoms, molecules, radicals, excited states, ions, and energetic electrons. Interestingly, the in-situ production of these reactive chemical species (RCS) by plasma does not necessarily require chemical agents. Further, a class of non-equilibrium plasmas can produce RCS at ambient pressure and temperature, enabling efficient RCS delivery in several emerging applications, including wound healing, food decontamination, water treatment, material synthesis, etc. In this light, recently, we have carried out a detailed study on atmospheric pressure argon rotating gliding discharge (RGD) in collaboration with the research group at the Center for sustainable technologies, IISc Bangalore. It is worth mentioning that GAD is reported to enable a very high fraction of input energy for desired chemical reactions. Therefore GADs are drawing significant interest for their use in plasma-mediated chemical processing applications. However, a reliable plasma diagnostic is required to achieve and optimize the required processing. By employing the combination of electrical and optical diagnostic approaches, we have carried out a detailed study on GAD under various operating conditions. During my talk, I shall discuss these diagnostic approaches along with our results. Various challenges in implementing these techniques and extracting the information of underlying processes will also be discussed.

Reference:

1. Ananthanarasimhan J, R K Gangwar et al, J. Appl. Phys. 129, 223301 (2021), doi: 10.1063/5.0044014

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