Diagnostics and applications of high frequency discharges


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Non-equilibrium plasmas proved to be able to produce large variety of chemically reactive species at a low gas temperature while maintaining uniform reaction rates over relatively large areas. The choice of the plasma system used for treatment is usually guided by the type of samples that are treated and effect these plasmas are intended to have on the samples. Some of the samples cannot undergo vacuum and due to this fact non-thermal atmospheric pressure plasmas lately have drawn considerable attention with their enormous potential for technological applications in surface modifications and biomedical applications. So far we have used several different high frequency plasma sources operating from low to atmospheric pressure for treatments of polymer, textiles [1], graphene [2], seeds [3], sterilization of bacteria and treatment of plant and stem cells [4, 5]. In order to be able to effectively use these plasma systems in treatments that demand different conditions it was necessary to make detailed diagnostics of these systems. We have used home-made derivative probes, Langmuir and catalytic probe, ICCD camera and mass-energy analyser that works both in low and atmospheric pressures to determine the optimal treatment parameters for various samples.

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References