

Influence of the atmospheric pressure plasma source configurations on the properties of treated liquid samples

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In recent years, expansion of non-equilibrium plasma applications is directed towards plasma sources operating at atmospheric pressure that are used for treatment of liquids. Usually, different applications involving liquid targets have different aims and, as precondition for all these applications, it is important to make the plasma processes as efficient as possible in every specific case. Therefore, these tasks are demanding due to the complexity of plasma chemistry, which depends on the type of plasma source and is further tangled by the presence of liquid target. Here we will present results of a laboratory-scale study aiming to make comparison between different plasma source configurations and to reveal their influence on treated pure and contaminated water samples. Two-level approach is necessary: on one side one should characterize the plasma used for treatments while, on the other side, properties of the liquid samples should be obtained. Detailed discharge diagnostics involving optical emission spectroscopy and electrical characterisation will provide information on plasma conditions for particular source. Emission spectrum provide information on excited species produced in the gas phase. Measurement of electrical signals allow to calculate power input provided to the system and thus establish a parameter describing the plasma. Additionally, certain physicochemical properties of the treated liquids (pH, dissolved Oxygen content, conductivity, total organic carbon content in contaminated samples etc.) will be obtained allowing to cross reference data with plasma characterization and give an insight into interaction chemistry of the specific plasma source used for liquid treatment. Results regarding the influence of different plasma source configurations to the treated liquid will be presented in the context of possibility of applications in the field of plasma agriculture (PAW, water decontamination etc.).