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(POS-67) Disinfection of Bacteria Contaminated Water Using Plasma Jet of Argon and Oxygen

Tuesday 7 June 2022 17:34 (2 minutes)

The aim of this work is to investigate the effectiveness of one of the novel disinfection methods that is based on cold plasma treatment. A particular plasma setup was adapted for the treatment of aqueous solutions and has been employed for the purification of water contaminated with bacterial strains. The treated samples were prepared by adding Staphylococcus aureus bacteria to distillated water, and then the treatment was carried out by submerging the aforementioned plasma jet in the suspension volume. The plasma discharge in our setup was ignited using a controlled mixture of argon and oxygen.
Results of this study showed that full water decontamination can be attained after about 12 minutes of treatment under 1.5 slpm of Argon gas flow containing 2.5±0.2% of oxygen. In addition, it is found that the oxygen ratio in the mixture is key parameter for the maintaining of the decontamination potential; exceeding 130 ml/min of oxygen flow rate resulted in the reproduction of the bacterial activity. Adding oxygen gas to argon leads to the creation in water of highly reactive oxygen based species (ROS), these species react with the microorganisms cells and lead to their destruction and to stop their reproduction. This study helped setting the ideal margins for the key parameters that should be taken into account while igniting the plasma in order to attain a full disinfection of water contaminated with harmful bacterial cells.

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