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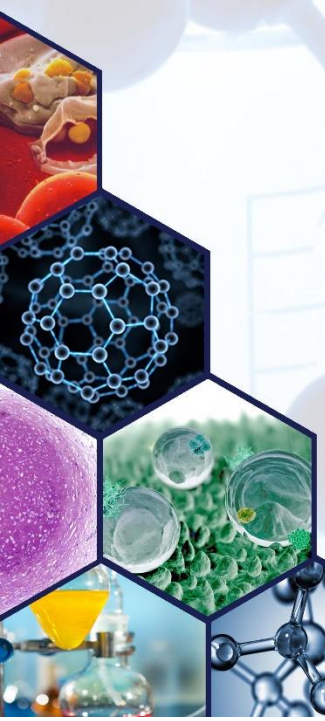

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Hydrogen peroxide production in water treated by non-thermal plasma in different atmospheres

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Chemical properties of distilled water treated by non-thermal plasma reactor were studied. Hydrogen-peroxide production, pH value and conductivity in distilled water were measured after plasma-treatment in air, argon and argon-oxygen mixture as working gases. Water falling film dielectric barrier discharge (DBD) reactor [1] was used for water treatment. Direct contact of water film with plasma in this reactor enables efficient transfer of reactive species generated in plasma to liquid phase. For optimization of reactive species production frequency and amplitude of the applied voltage were varied.

Chemical characterization of water treated by DBD generated in different gases shows that hydrogen peroxide production in argon reaches yield of 0.78 g/kWh, while in air it was 0.19 g/kWh. Both measurements were made with 35 W of power dissipated in plasma. Moreover, significant influence of gas atmosphere was observed in measurements of pH value and conductivity which imply that production of ions is about 15 times greater in water treated with plasma generated in air than in argon.
Advanced oxidation using this type of non-thermal plasma reactor enables production of active species *in situ*, while working in ambient conditions.[1] Effectiveness of plasma treatment was already confirmed with degradation of some waterborne pharmaceuticals.[2] This opens opportunities for new studies of plasma oxidation of pharmaceuticals in aquatic environments.

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