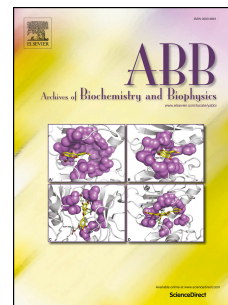


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NON-THERMAL PLASMA FOR AIR AND WATER REMEDIATION

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ABSTRACT

A modular typed dielectric barrier discharge (DBD) device is designed and tested for air and water remediation. The module is made of a number of DBD tubes that can be arranged in series or parallel. Each of the DBD tubes comprises inner electrode enclosed with dielectric barrier and arranged as such to provide a gap for the passage of gases. Non-thermal plasma generated in the gap effectively creates gaseous chemical reactions. Its efficacy in the remediation of gas stream containing high NO_x, similar to diesel emission and wastewater containing latex, are presented. A six tubes DBD module has successfully removed more than 80% of nitric oxide from the gas stream. In another arrangement, oxygen was fed into a two tubes DBD to generate ozone for treatment of wastewater. Samples of wastewater were collected from a treatment pond of a rubber vulcanization pilot plant. The water pollution load was evaluated by the chemical oxygen demand (COD) and biological oxygen demand (BOD₅) values. Preliminary results showed some improvement (about 13%) on the COD after treatment and at the same time had increased the BOD₅ by 42%. This results in higher BOD₅/COD ratio after ozonation which indicate better biodegradability of the wastewater.

Keywords

Ozonation; dielectric barrier discharge; nitric oxide; chemical oxygen demand; biological oxygen demand

The purpose of this work is to design and demonstrate a be used by local small medium industries to remediate gaseous emission or wastewater from their factories or plants.

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