OXIDATION OF BISPHENOL A BY PULSED CORONA DISCHARGE: IMPACTS OF PLASMA-LIQUID CONTACT SURFACE AND A SURFACTANT RADICAL SCAVENGER

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Bisphenol A (BPA) is an industrial widespread synthetic chemical used in polycarbonate plastic industry and, therefore, is widely present in the environment as a micropollutant [1]. BPA has been proven to have estrogenic activity even at concentrations below 1 μg L^{-1} [2].

This study aimed investigation of BPA degradation using pulsed corona discharge (PCD) with effects of the plasma-liquid contact surface and a surfactant radical scavenger on energy efficiency, and provide comparison with other advanced oxidation processes (AOPs).

The obtained results showed that increased plasma-liquid contact surface has only a moderately positive effect on energy efficiency of BPA degradation allowing operation at low flow rates developing suitable plasma-liquid contact surface. The addition of surfactant sodium dodecyl sulphate (SDS) at a concentration of 100 mg L^{-1} showed a slight negative impact on the oxidation efficiency of BPA at higher concentrations of the latter, i.e. at the beginning of treatment. At lower BPA concentrations, the effect of SDS addition was negligible. Apparently, BPA is a substance demonstrating a balance between the surfactant radical-screening effect at the plasma-liquid interface, hindering surface reaction, and the affinity of BPA molecules with hydrophobic parts of SDS molecules, bringing BPA closer to the liquid surface, enhancing the reaction. Oxidation of BPA by PCD showed generally higher energy efficiency than other conventional AOPs and ozonation demonstrating its promising potential in water treatment applications.

References

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