

Degradation of Different Organic Contaminates Using Corona Discharge Plasma

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Abstract : In this paper, corona discharge plasma reactor was used for degradation of organic pollution in aqueous solutions in batch reactor. This work examines the possibility of increasing the organic pollution removal efficiency from wastewater using non-thermal plasma. Three types of organic pollution phenol, acid blue 25 and methylene blue are presented to investigate experimentally the amount of organic pollution removal efficiency from wastewater. Measurement results for phenol degradation percentage are 71% in 35 min and 96% when its residence time is 60 min. In addition, the degradation behavior of acid blue 25 utilizing dual pin-to-plate corona discharge plasma system displays a removal efficiency of 82% in 11 min. The complete decolorization was accomplished in 35 min for concentration of acid blue 25 up to 100 ppm. Furthermore, the methylene blue degradation touched up to 85% during 35 min treatment in corona discharge plasma a batch reactor system. The decolorization ratio, conductivity, corona current and discharge energy are considered at various concentration molarity for $AlCl_3$, $CaCl_2$, KCl and $NaCl$ under different molar concentration. It was observed that the attendance of salts at the same concentration level considerably diminished the rate and the extent of decolorization. The research presented that the corona system could be positively utilized in a diversity of organically contaminated at diverse concentrations. Energy consumption requirements for decolorization was considered. The consequences will be valuable for designing the plasma treatment systems appropriate for industrial wastewaters.

Keywords : wastewater treatment, corona discharge, non-thermal plasma, organic pollution

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