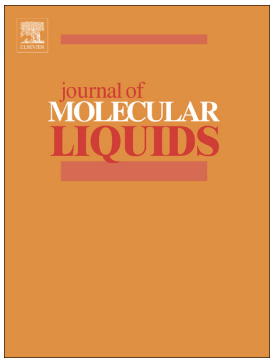

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Dielectric barrier discharge plasma as excellent method for Perchloroethylene removal from aqueous environments: degradation kinetic and parameters modeling

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Abstract:
Former study evidences has indicated that Perchloroethylene (PCE) is the possible carcinogen to humans. Studies carried out on humans have also shown that PCE exposure may cause different types of cancer such as kidney, esophagus and cervix cancer, and also associated with non-Hodgkin lymphoma.
So, in this study the effects of different variables including induced voltage, PCE concentration and contact time, have been examined for Perchloroethylene removal by non-thermal plasma.
For this purpose, the Non Thermal Plasma (NTP) created via the dielectric barrier discharge (DBD) set up and oxidation process completed by generating of O•, H• and OH.
Based on result at the constant input voltage of 12.03 and lower initial PCE concentrations, the maximum PCE removal efficiency occurred but generally with increasing reaction time PCE removal efficiency increased even while initial PCE concentrations reach maximum value, and increase of input voltage and reaction time, along with decreasing initial PCE concentration enhanced PCE removal.

Keywords: Perchloroethylene, Non Thermal Plasma, Dielectric barrier discharge

1. Introduction

Perchloroethylene is one of the most extensively used solvents which commonly produced in analytical, commercial, and industrial grades for application in different formulations. Approximately 520000 tons of Perchloroethylene are used every year all over the world [1], half of this amount, was used for dry-cleaning activity, 30% for chemicals polymerization, 15% for metal cleaning and degreasing and 5% for other uses [2-4]. Perchloroethylene is a