

Preface

In the recent years, non-thermal plasmas, including glow discharge, corona discharge, dielectric barrier discharge, gliding arc discharge, radio frequency discharge, and microdischarge, have been continuously developed and utilized in few fields, such as chemistry, biology, physics, biotechnology, medicine, and environmental science.

In Chap. 1 of this book, the types of non-thermal plasma, and the techniques of plasma science for remediating contaminated soil, wastewater degradation, metal recovery from waste solution, sterilization, and polluted air are described in detail. In Chap. 2, development of non-thermal plasma fluidized bed (PFB) for remediating phenanthrene-contaminated soil, how 95% of phenanthrene can be removed with an energy density of 5960 J/g soil %, and the proposal of possible mechanisms of the phenanthrene degradation by the PFB are discussed. In Chap. 3, how a gliding arc plasma reactor can be used for the degradation and discoloration of the textile dyes solutions is explained. What type of kinetics is followed by the discoloration and degradation for mixed dyes with zerovalent iron is also explained in the same chapter. In Chap. 4, development of a microplasma jet system for reducing Cr(VI) in wastewater and how 100% of Cr(VI) could be reduced after a 2-min discharge treatment with an energy density of 300 J/mL water are elucidated. In Chap. 5, the efficiency and effectiveness of surface sterilization using humid air gliding arc discharge and how sterilization can be improved efficiently under different air flow rates and gap distances are described. In Chap. 6, development of non-thermal PFB for decomposing volatile organic compounds is elaborated.

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