Abstract Submitted
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Conversion of Organic Compounds by Pulsed Discharge Plasma in Sub- and Supercritical Fluids[1] MOTONOBU GOTO, MITSURU SASAKI, Kumamoto University, DIONO WAHYU, KOICHI NAGAFUCHI, HIROSHI WATANABE, TSUYOSHI KIYAN, TAKAO NAMIHIRA, HIDENORI AKIYAMA, BIOELECTRICS RESEARCH CENTER TEAM, GRADUATE SCHOOL OF SCIENCE AND TECHNOLOGY TEAM — Discharge plasmas in sub- and supercritical fluids have high possibilities as a novel reaction field. We have studied generation of pulsed discharge plasma in subcritical or supercritical fluids, such as carbon dioxide, water, or argon. Two-phase system, where liquid and supercritical fluid coexist, was also used as a media to generate discharge plasma. The discharge behavior was investigated in terms of breakdown phenomena. Plasma generated in supercritical carbon dioxide was used for the reaction of palmitic acid. By treating at 313 K, 15 MPa, and 2000 times plasma discharges, production of myristic acid and stearic acid was observed, indicating C-C bond cleavage or C-C bond formation. We also applied plasma generated in subcritical water to chemical reactions of phenol and aniline. Phenol was decomposed to 17% of the conversion after 4,000 times discharged at 523 K, 25 MPa. The analysis of oily product found that phenol was converted into its dimer and trimer. In trimer, hydroxyl radical of phenoxy radical was bonded at meta position in phenol. When aniline was used as a reactant, the polymerization of aniline was also observed.

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Motonobu Goto
Kumamoto University

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