

Abstract Submitted  
for the GEC15 Meeting of  
The American Physical Society

**One Step Phenol Production from Toluene Solution Using RF In-Liquid Plasma** MUHAMMAD AGUNG, SHINFUKU NOMURA, SHINOBU MUKASA, HIROMICHI TOYOTA, Graduate School of Science and Engineering, Ehime University, Matsuyama, Ehime 790-8577, Japan, HIDEKAZU GOTO, Osaka University, 1-1 Yamadaoka, Suita, Osaka 565-0871, Japan, OTSUKA KAZUHIKO, Graduate School of Science and Engineering, Ehime University, Matsuyama, Ehime 790-8577, Japan — The objective of this research is to investigate the possibility of phenol production with one step process directly from solution of toluene and pure water using plasma in-liquid method. Experiments have been conducted using 27,12 MHz Radio Frequency in-liquid plasma to decompose a solution of 30% toluene. When the plasma was formed in the liquid solution, molecule water substance was decomposed to OH radicals,  $H\alpha$ ,  $H\beta$  and O by plasma energy. In phenol production using the proposed method, OH radicals play a major role during the process of direct chemical reaction with toluene. In the sample residue liquid solution, phenols spectral lines are observed by GCMS. Experimental investigations clearly show that phenol can be directly produced from toluene.

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Date submitted: 16 Jun 2015

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