

Abstract Submitted
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Phenol decomposition by pulsed-plasma exposure in oxygen and argon atmosphere KOHKI SATOH, HARUKI SHIOTA, HIDEYUKI ITABASHI, HIDENORI ITOH, Muroran Institute of Technology — Phenol in an aqueous solution is decomposed by the exposure of pulsed-discharge plasma, and by-products are investigated by gas chromatograph mass spectrometry. When Ar is used as a background gas, catechol, hydroquinone and 4-hydroxy-2-cyclohexene-1-on are produced, and no O₃ is produced; therefore, OH radicals generated in the plasma can initiate the decomposition of phenol, and 4-hydroxy-2-cyclohexene-1-on can be produced. Further, 4-hydroxy-2-cyclohexene-1-on can be converted into catechol and hydroquinone. When O₂ is used as a background gas, catechol, hydroquinone, formic acid, maleic acid, succinic acid and 4,6-dihydroxy-2,4-hexadienoic acid are produced. Therefore, phenol is probably decomposed into 4,6-dihydroxy-2,4-hexadienoic acid by 1,3-dipolar addition reaction with O₃, and 4,6-dihydroxy-2,4-hexadienoic acid can be decomposed into maleic acid and succinic acid by 1,3-dipolar addition reaction with O₃. Oxalic acid is possibly another by-product from 4,6-dihydroxy-2,4-hexadienoic acid, since formic acid, which is produced from oxalic acid, is detected.

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