

Kinetic study of the gas-phase reactions of chlorine atoms with 2-chlorophenol, 2-nitrophenol and *ortho*-, *meta*- and *para*-cresol

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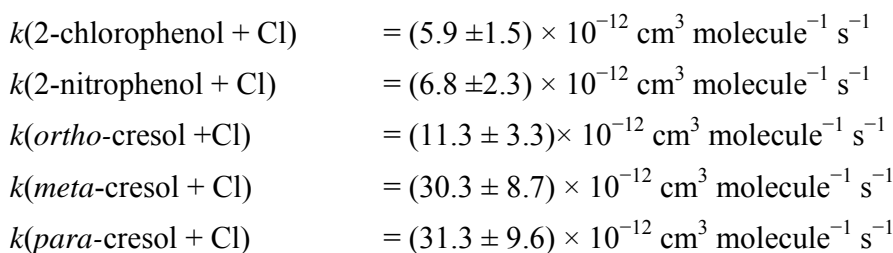
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Among the different classes of anthropogenic volatile organic compounds (VOCs) emitted into the urban troposphere, aromatic hydrocarbons (AHs) are of particular interest [1]. They represent 25% of anthropogenic VOCs with up to a 30% contribution to both photo-oxidant and SOA formation in the urban environment [1]. From the class of AHs, cresols are of significance since they represent primary oxidation products of main emitted AHs: benzene, toluene and xylenes (BTXs) [1].

In the past, atmospheric chlorine chemistry was considered of importance only for marine boundary layer. However, the detection of significant levels of nitryl chloride in mid-continental areas has shown that chlorine chemistry is potentially more important than previously thought [2].

Rate coefficients for the reaction of chlorine atoms with the three cresol isomers, 2-chlorophenol and 2-nitrophenol have been obtained using a relative kinetic technique. The experiments have been performed in two well recognized reaction chambers: QUAREC chamber in Wuppertal, Germany and HIRAC chamber in Leeds, UK.

The following rate coefficients have been obtained for the title reactions:



This study represents the first kinetic investigation for the reaction of chlorine atoms with all cresol isomers. Atmospheric implications will be discussed. The results provide new and interesting information for the atmospheric oxidation of cresol isomers, 2-chlorophenol and 2-nitrophenol from the kinetic point of view.

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References

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