



A study of the OH reaction with 1-methyl-2-pyrrolidinone, N-methylsuccinimide and 1-formyl-2-pyrrolidinone

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A number of organic compounds currently used as solvents are known to have adverse health effects. Moreover, many solvents undergo complex chemical reactions in the atmosphere leading to the formation of photochemical oxidants. For these reasons, it is now accepted that the replacement of traditional solvents by oxygenated compounds is inevitable. Nitrogen containing oxygenated compounds are among the new solvent considered. In the troposphere, these compounds may react with OH and NO₃ radicals and with O₃. To date, a limited number of studies have been performed on this type of compounds. Therefore, kinetic and mechanistic data are needed in order to determine their lifetimes in the troposphere and to assess their contribution to urban pollution.

We have studied the OH-initiated oxidation of 1-methyl-2-pyrrolidinone (NMP) under atmospheric conditions using a laboratory photoreactor and the outdoor European Photoreactor, EUPHORE. The OH-initiated oxidation mechanism has been determined and the reaction products, N-methylsuccinimide (NMS) and 1-formyl-2-pyrrolidinone (FP) were quantified. In addition, the rate constants for the reaction of OH with NMP, NMS and FP have been measured. The obtained data will be presented and discussed in terms of their impact on air quality.