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# FT-IR study of the gas-phase reaction of dimethyl sulfoxide with athomic chlorine

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Dimethyl sulphide (DMS) produced in the oceans by the biological activity of phytoplankton and volatilised to the atmosphere, is considered to be the main natural source of sulphur in the atmosphere. DMS has been postulated to be involved in the global climate system through the formation of aerosols and CCN which influence the Earth's radiation budget. Laboratory studies have shown that dimethyl sulphoxide (DMSO) is an intermediate species of the addition route of the hydroxyl (OH) radical initiated oxidation of dimethyl sulphide and that it is also formed in the reaction of DMS with BrO. DMSO has been also observed in the marine atmosphere. Although the OH reaction is the major gas-phase oxidation process for DMSO in the atmosphere, reactions with halogen species may also play some role. The kinetic and mechanistic information available for the reaction of Cl atoms with DMSO is limited.

We report here kinetic and product results on the chlorine atom initiated oxidation of DMSO using the photolysis of thionyl chloride (SOCl2) as the Cl atom source.

The experiments have been carried out in a 1080 L reaction chamber under different conditions of temperature (286 – 316 K) and oxygen partial pressure (0 – 205 mbar) at a total pressure of 1000 mbar bath gas. Long path in situ FT-IR (Fourier Transform Infrared) spectroscopy was used to monitor the reactants and products. The kinetics of the reaction of DMSO with Cl atoms has been studied using a relative rate method.

A comparison with other literature data and possible atmospheric implications will be made.