

Laser-based Laboratory Studies of Cl-Reactions in Aqueous Solution

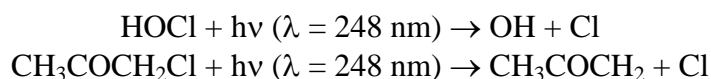
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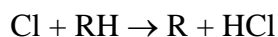
During the last years halogen activation became an often used terminus in atmospheric chemistry (Vogt et al., 1996; Sanders and Crutzen, 1996). Model calculations indicate that halogene-atom chemistry does not only play a role in gas-phase chemistry but also in the chemistry of aerosol particles and cloudwater (Herrmann et al., 1999, 2000). Therefore in this study the absorption spectrum of aqueous chlorine and reactions of Cl_(aq) with different organics were investigated.

Chlorine atoms were generated by excimer-laser-photolysis of aqueous solutions containing HOCl as well as aqueous solutions containing chloroacetone as chlorine atom precursor substance at 248 nm according to:



For the spectroscopic investigations a time resolved laser-photolysis-broadband-diode-array-absorption experiment was used. For the kinetic investigations a laser-photolysis-longpath-laser-absorbance (LP-LPA) apparatus was used.

With a number of organic substances the Cl atom reacts via the abstraction of an H-atom, according to:



A correlation between the strength of the C-H bond and the rate of the H-atom-abstraction reaction was found. This correlation can be used to estimate reaction rates of H-atom-abstraction reactions of Cl atom from extrakinetical data (i.e. BDE).

The results that were obtained in this study can be used in modelling studies and though may be helpful for a better understanding of the tropospheric aqueous phase.

Literature

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Sander R. and P.J. Crutzen, *J. Geophys. Res.* **101**, 9121 (1996).