



Laboratory studies on the OH-initiated oxidation of acetone in the aqueous phase

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Small organic compounds, such as acetone and its oxidation products, are emitted by a variety of natural and anthropogenic sources in the atmosphere. The degradation or transformation of these compounds can occur in the gas phase and in the liquid phase (cloud droplets, fog, rain or hygroscopic particles) of the troposphere. A special role plays the OH radical, which is one of the most reactive radicals in the atmosphere.

To study the OH radical reaction towards small organic compounds in the aqueous phase, a thermostated laser photolysis long path absorption set-up was used. The OH radicals were generated directly in the reaction cell by the photolysis of hydrogen peroxide (H_2O_2) at $\lambda = 248$ nm and monitored using the thiocyanate reference system. Furthermore, the objective of this work is to identify and characterize the various transient species formed in the OH radical reaction. In order to characterize the optical properties of the formed transient compounds (e.g. organic peroxy radicals) a laser photolysis long path absorption apparatus coupled with a CCD-camera / grating combination is used. With this technique time resolved spectra (at different delay times after the excimer laser pulse) of the reactants and products can be recorded. Within this contribution organic peroxy radical spectra of the following parent carbonyl compounds (a) acetone, (b) hydroxyacetone and (c) methylglyoxal will be presented, discussed and compared with literature data.

The optical characterization of the formed transient compound is necessary to measure rate constants of elementary reaction steps in the degradation process of the small organic compounds.