

Rate coefficients for the reaction of formaldehyde with HO₂ radicals from fluorescence spectroscopy of HOCH₂OO radicals

Arne Bunkan, Damien Amédro, and John Crowley

Division of Atmospheric Chemistry, Max Planck-Institut für Chemie, 55128 Mainz, Germany

The reaction of formaldehyde with HO₂ radicals constitutes a minor, but significant sink of formaldehyde in the troposphere as well as a possible interference in other formaldehyde photooxidation experiments.



Due to the difficulty of simultaneously monitoring the reactant and product concentrations while preventing interfering secondary chemistry, there is a considerable uncertainty in the literature values for the reaction rate coefficients.

We have used two photon, excited fragment spectroscopy (TPEFS), originally developed for monitoring HNO₃ formation in kinetic experiments, to monitor the formation of the HOCH₂OO radical. Dispersed and single wavelength fluorescence emission following the 193 nm photolysis of HOCH₂OO have been recorded and analysed. Characterisation of the method is presented along with rate coefficients for the reaction of HCHO with HO₂ radicals at tropospheric temperatures.