

Heterogeneous reaction of HO₂: Measurement of uptake coefficients by aerosol particles sampled in the ambient air

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HO_x(=OH+ HO₂) radicals play a central role in the tropospheric chemistry. The total concentration of HO_x radicals is determined by the balance of sources and sinks. Recent field measurements of HO_x radicals suggested that the heterogeneous loss of HO₂ by aerosol particles was potentially important HO_x sink in the troposphere. However, there are a few data to assess the contribution to HO₂ loss by aerosols. In this study, the HO₂ uptake coefficients for aerosol particles sampled by filter in ambient air were measured using an aerosol flow tube (AFT) coupled with a chemical conversion/laser-induced fluorescence (CC/LIF) technique at 760Torr and 298K. Aerosol particles were regenerated by atomizer using the water extract of aerosol particles sampled on filter at four sites. The CC/LIF technique enabled experiments at HO₂ radical concentrations similar to those in the atmosphere. The uptake coefficients of HO₂ by sampled aerosol particles were in the range of 0.1-0.4 at 75% of relative humidity. These values were generally larger than those by single component particles, suggesting contribution of minor composition in the particle. To assess the impact of the heterogeneous loss for HO₂, we carried out box model calculations for the diurnal variation of HO₂ concentration.