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Accommodation coefficient of HOBr on deliquescent sodium bromide aerosol particles

M. Wachsmuth[1,2], H. W. Gäggeler[1,2], R. von Glasow[3,*], and M. Ammann[1]

[1]Paul Scherrer Institut, Laboratory for Radio- and Environmental Chemistry, Villigen, Switzerland

[2]Also at Department of Chemistry and Biochemistry, University of Bern, Bern, Switzerland

[3]Max-Planck-Institut für Chemie, Abt. Chemie der Atmosphäre, Mainz, Germany

[*]Present address: Center for Atmospheric Sciences, Scripps Institution of Oceanography, University of California, San Diego, USA

Abstract. Uptake of HOBr on sea salt aerosol, sea salt brine or ice is believed to be a key process providing a source of photolabile bromine (Br_2) and sustaining ozone depletion cycles in the Arctic troposphere. In the present study, uptake of HOBr on sodium bromide (NaBr) aerosol particles was investigated at an extremely low HOBr concentration of 300 cm^{-3} using the short-lived radioactive isotopes $^{83-86}Br$. Under these conditions, at maximum one HOBr molecule was taken up per particle. The rate of uptake was clearly limited by the mass accommodation coefficient, which was calculated to be 0.6 ± 0.2. This value is a factor of 10 larger than estimates used in earlier models. The atmospheric implications are discussed using the box model "MOCCA'', showing that the increase of the accommodation coefficient of HOBr by a factor of 10 only slightly affects net ozone loss, but significantly increases chlorine release.

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