Geophysical Research Abstracts, Vol. 7, 06384, 2005
SRef-ID: 1607-7962/gra/EGU05-A-06384

High-resolution spectroscopy of the $2\nu_1$ bands of HOBr in the near-infrared

J. Orphal, J.-M. Flaud, F. Kwabia Tchana, O. Pirali, and Q. Kou

Laboratoire de Photophysique Moléculaire (LPPM), CNRS, Bât. 350, Université de Paris-Sud, 91405 Orsay Cedex, France

HOBr plays an important role in atmospheric chemistry. It is formed in the stratosphere by the gas-phase reaction between BrO and HO_2 radicals and by heterogeneous reactions of $BrONO_2$ with H_2O on Polar Stratospheric Cloud particles. HOBr is rapidly photolyzed by sunlight releasing OH and Br radicals that destroy ozone in catalytic cycles. In the troposphere, HOBr is formed by several reactions including heterogeneous chemistry on sea salt aerosols, and – in addition to photolysis and gas-phase reactions – can be removed from the gas phase by dissolution in aqueous aerosol particles.

Atmospheric detection of HOBr is difficult because of its rather low concentrations. In order to assess the possibility of HOBr detection in the near-infrared using highly sensitive laser methods (e.g. Cavity-Ringdown or Photoacoustic Spectroscopy), we have recorded the $2\nu_1$ bands (OH stretching overtone) of $HO^{79}Br$ and $HO^{81}Br$ around 1.4 microns with a high-resolution Fourier-transform spectrometer. Line positions and intensities have been determined, and the possibility of atmospheric detection will be discussed. Furthermore, these bands are also very interesting for laboratory studies of HOBr chemistry.