Hydrogen Peroxide Absorption at Long Wavelengths: Implications for HO_x Cycling

Tara F. Kahan,[1] R. A. Washenfelder,[2,3] V. Vaida,[1,3] and S. S. Brown[2*]

[1] University of Colorado, Boulder, CO, USA
[2] National Oceanic and Atmospheric Administration (NOAA), Boulder, CO, USA
[3] Cooperative Institute for Research in Environmental Sciences (CIRES), Boulder, CO, USA
* Corresponding author: Steven.S.Brown@noaa.gov

We have measured hydrogen peroxide (H_2O_2) absorption cross sections between 353 and 410 nm using incoherent broad-band cavity-enhanced absorption spectroscopy (IBBCEAS).[1] These measurements extend published electronic absorption cross sections by 60 nm, to absorption cross sections as low as 1×10^{-23} cm^2 $molecule^{-1}$. Photolysis rate constants calculated using these measurements at wavelengths longer than 350 nm as well as published cross sections at wavelengths shorter than 350 nm indicate that absorbance at longer wavelengths can account for up to 25% of H_2O_2 photolysis at high solar zenith angles. Loss of H_2O_2 via photolysis may be competitive with reactions with hydroxyl radicals and dry deposition in the lower atmosphere; these processes affect HO_x cycling very differently.

References

(1) Kahan, T.F.; Washenfelder, R.A.; Vaida, V.; Brown, S.S. *J. Phys. Chem. A* **2012**, in press.

THURSDAY