Heat of Formation of OBrO: An Experimental Photoionization Study

R. Bruce Klemm¹, R. Peyton Thorn², Louis J. Stief², and Thomas J. Buckley³. (1) Dept. of Applied Science, Brookhaven National Lab, Building 815, P O Box 5000, Upton, NY 11973, phone: 516-344-4022, fax: 516-344-7905, klemm@bnl.gov, (2) NASA/ Goddard Space Flight Center, Mail Code 690, Greenbelt, MD 20771, (3) Physical and Chemical Properties Div, National Institute of Standards and Technology, Building 221/ Room A119, Gaithersburg, MD 20899-8380

The potential importance of OBrO in atmospheric chemistry has been suggested recently. Although there appear to be no experimental measurements of \( \Delta H(\text{OBrO}) \), estimated values range from 70 to 152 kJ/mol [Chase, M. W. J. Phys. Chem. Ref. Data, 1996,25, 1069; ibid, 1297]. In the present investigation, the appearance energy (AE) of BrO\(^+\) from OBrO was measured by employing a discharge flow-photoionization mass spectrometer that is operated at beamline U-11 (National Synchrotron Light Sourse/ Brookhaven National Lab). The heat of formation was derived from the AE result and the ionization energy of OBrO [IE=10.29 eV, Thorn et al., J. Phys. Chem. A 1999, 103, 8384]. The AE experiments yield a threshold at about 98.7 nm that gives, in turn, a value for \( \Delta H(\text{OBrO}) \) of 180 \( \pm \) 10 kJ/mol. The difference with the estimated values mentioned above and the concommitant implications for the atmospheric reactions of OBrO will be discussed.

ACCEPTED

Abstract ID#: 378001
Password: 861984
Program Selection: Division of Physical Chemistry [0.0000]
Topic Selection: Poster Session: Atmospheric Chemistry
Title: Heat of Formation of OBrO: An Experimental Photoionization Study
Invited: N
Presentation Format: Poster Only
Consider for Sci-Mix: N
Special Equipment Needs: standard poster
Conforms to Bylaw 6: Y

First Author

Presenting
R. Bruce Klemm
Dept. of Applied Science
Brookhaven National Lab
Building 815
P O Box 5000
Upton, NY 11973
Phone Number: 516-344-4022
Fax Number: 516-344-7905
Publishable Email: klemm@bnl.gov
* ACS Member
* Membership Number 00156345
Division Member

Second Author

Presenting
R. Peyton Thorn  
NASA/ Goddard Space Flight Center  
Mail Code 690  
Greenbelt, MD 20771  
Phone Number: 301-286-4647  
Fax Number: 301-286-0212  
Email: yrspt@lepvax.gsfc.nasa.gov

Fourth Author

Louis J. Stief  
NASA/ Goddard Space Flight Center  
Mail Code 690  
Greenbelt, MD 20771  
Phone Number: 301-286-7529  
Email: u1ljs@lepvax.gsfc.nasa.gov  
* ACS Member  
* Membership Number 00265190  
* Division Member

Fifth Author

Thomas J. Buckley  
Physical and Chemical Properties Div  
National Institute of Standards and Technology  
Building 221/ Room A119  
Gaithersburg, MD 20899-8380  
Phone Number: 301-975-2560  
Publishable Email: thomas.buckley@nist.gov