



Heterogeneous Ice Processes Important for Odd Hydrogen and Ozone on Mars

Oleg Kostko, Jochen Marschall, and Konstantinos S. Kalogerakis

SRI International, Molecular Physics Laboratory, Menlo Park, United States (ksk@sri.com)

Odd-hydrogen chemistry plays an important role in the ozone budget and the stabilization of carbon dioxide in the Martian atmosphere. In the lower atmosphere, heterogeneous processes influence the fate of odd-hydrogen species. The quantitative details of these heterogeneous physicochemical processes are poorly understood, leading to discrepancies between models and observations of the Martian atmosphere. Atmospheric models consistently underestimate the ozone abundances and overestimate the hydrogen peroxide densities. Heterogeneous loss of odd-hydrogen species has been suggested as a possible explanation. Relevant laboratory results are scarce in the literature, especially at the temperature range appropriate for the Martian atmosphere. We are conducting laboratory experiments to determine the uptake of various odd-hydrogen species by water ice and other substrates. We use a Knudsen cell apparatus, which is a low-pressure stirred-flow reactor in a configuration that allows heterogeneous uptake effects to be quantified by the change in the concentration of a gas phase species mixture flowing over a condensed matter substrate. We will present our recent results and discuss their relevance to the Martian odd-hydrogen and ozone chemistry.

This material is based upon work supported by the U.S. National Aeronautics and Space Administration under Grant NNX10AM85G issued through the Mars Fundamental Research Program.