

Colloquium Announcement

ELECTRONIC DESORPTION FROM "SURFACES" WITHIN PORES OF LOW TEMPERATURE ICE

Gregory A. Grieves and Thomas M. Orlando
*School of Chemistry and Biochemistry, Georgia Institute of Technology,
Atlanta, Georgia USA 30332-0400*

Radiation induced surface desorption from low temperature water ice plays a crucial role in the astrochemistry of icy planetary surfaces, comets and ice-covered interstellar grains. Excitations from low energy electrons or VUV photons can move through the hydrogen bonding network of ice until they encounter a surface or a defect and induce chemical dissociation. Ices deposited at very low temperatures, such as those in interstellar space, exhibit a low density and have a highly porous amorphous structure. These pores act as open structures which enclose a volume of vacuum and give the porous ice a relatively high internal surface area. The hydrogen bonding characteristics of water at the interface of these pores should resemble that of the outer surface vacuum interface, which has been well characterized.

The effects of porosity and morphology of amorphous and crystalline D₂O ices on the electron stimulated generation and trapping of D₂ and O₂ have been studied by post-irradiation thermal desorption. The trapped product yields increase from crystalline ice to amorphous ice to highly porous amorphous ice, similar to observed surface Electron Stimulated Desorption (ESD) yields. This is attributed to the increased number of defects, traps and pores in amorphous ice. Trapping and delayed release at temperatures well above their normal is attributed to the physical retention of the gases in pores, grain boundaries and defects. This delayed release may play an important role in estimates of outgassing of grains near hot cores and comets during their approach to the sun.

Sponsored by UAB Department of Physics

Thursday, October 12, 2006

12:30 p.m. – 1:45 p.m.

Campbell Hall 274

Refreshments served at 12:00 p.m. in CH 361

1300 University Boulevard
For further information, please contact the
Department of Physics (205) 934-4736