Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

An ambient FTIR study of small molecules on MgO(100) as a model for dust interactions in the troposphere MICHELLE FOSTER, University of Massachusetts Boston — Magnesium oxide is a model basic oxide, having a simple rock-salt structure, a single valence state, only one stable low-index surface orientation-the (100) face, and most importantly, it is transparent in the infrared. So while MgO is not a common mineral found in tropospheric dust, it can be used as a model substrate for studies of adsorption and reactions on tropospheric dust particles. I have investigated the dynamic equilibrium occurring between MgO(100) surfaces and a series of small molecules, including water, methanol and acetic acid, in an attempt to model the role played by metal oxide surfaces in heterogeneous tropospheric chemistry. A sample cell has been constructed such that many of these infrared transparent surfaces are investigated. The adsorbate of interest is introduced at the desired pressure and allowed to establish a dynamic equilibrium with the MgO(100). The adlayer formed on the crystal faces is observed by transmission-FTIR spectroscopy, and a quantitative determination of adlayer coverages is determined using a modified Beer-Lambert Law. The substrates have also been inspected with atomic force microscopy (AFM) both before and after each series of experiments. The interactions of these adsorbates with MgO(100) under room temperature conditions and pressures on the order of 10 Torr vary from physisorbed, as is the case with methanol all the way up to dissociatively chemisorbed, as is the case with acetic acid.

Michelle Foster
University of Massachusetts Boston

Date submitted: 01 Dec 2004 Electronic form version 1.4