Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Gas Adsorption Properties of Graphene-Oxide-Frameworks and Nanoporous Benzene-Boronic Acid Polymers JACOB BURRESS, JASON SIMMONS, NIST Center for Neutron Research, JAMIE FORD, TANER YILDIRIM, NIST Center for Neutron Research, University of Pennsylvania — There has been a recent resurgence in graphene oxide research as a potential route to large scale graphene synthesis. Recent research has also used dehydration reactions of boronic acids for the formation of covalent organic frameworks (COFs) and other new nanoporous materials. We are trying to synthesize graphene-oxide-frameworks (GOFs) by linking the OH groups on graphene oxide with benzene-boronic acids. Our initial x-ray studies indicate that the benzene-boronic acids are successfully incorporated into graphene-oxide (GO) layers expanding the interlayer spacing up to 12 Ang. We also found that the amorphous phases of bare dehydrated benzene-boronic acid polymers (amorphous borocarbons, ABCs) show quite interesting and unusual hydrogen adsorption behavior. The diffusion of hydrogen into the sample is thermally activated. While there is no adsorption at 30 K, the rate of excess adsorption increases with increasing temperature up to 70 K. We will present detailed high-pressure isotherms of H2/CO2/Methane at different temperatures of these interesting new GOF materials and dehydrated boronic acid polymers.

Jacob Burress
NIST

Date submitted: 20 Nov 2009 Electronic form version 1.4