Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Synthesis, characterization and application of highly crystalline sp^2 – bonded boron nitride aerogels THANG PHAM, Materials Science and Engineering, Physics Department, UC Berkeley, ANNA GOLDSTEIN, Chemistry, Physics Department, UC Berkeley, MARCUS WORSLEY, LETA WOO, Physical Science Directorate, Lawrence Livermore National Laboratory, WILLIAM MICKELSON, Center of Integrated Nanomechanical System (COINS), UC Berkeley, ALEX ZETTL, Physics Department, COINS, UC Berkeley. Kavli Energy NanoSciences Institute, UC Berkeley, Materials Science Division, Lawrence Berkeley National Lab — Aerogels have much potential in both research and industrial applications due to high surface area, low density and fine pore size distribution. Here we report a versatile synthesis and thorough structure characterization of three-dimensional aerogels composed of highly crystalline sp^2 – bonded BN layers formed by carbothermal reaction. The structure, crystallinity and bonding of the as-prepared BN aerogels were elucidated by x-ray diffraction, nuclear magnetic resonance of ^{11}B, transmission electron microscopy (TEAM) and resonant soft x-ray scattering. The macroscopic roughness of the aerogel's surface causes it to be superhydrophobic with a contact angle of $155 \pm 3^\circ$ and high oil uptake (up to 1500 wt%). The used BN aerogel can be regenerated by different heat treatments and still maintain the crystalline porous structure and adsorption capacity. The highly crystalline, chemically pure, thermally stable and porous sp^2 – boron nitride aerogel is an ideal host for liquids, gases and other nanomaterials.

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Date submitted: 14 Nov 2014 Electronic form version 1.4