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Mechanics of Crystalline Boron Nanowires WEIQIANG DING, Northwestern University, LORENZO CALABRI, Universit di Firenze, Italy, XINQI CHEN, RODNEY S. RUOFF*[1], Northwestern University — 1-d nanostructures such as nanowires (NWs) have attracted attention in part due to their promise in sensing, materials reinforcement, and nanoelectronics. Crystalline boron NWs have been synthesized by the CVD method with preformed metal catalyst particles. They have *p*-type semiconductor behavior, and show rectification. We report two mechanical properties of these B NWs, which were studied with the *mechanical resonance method* and *tensile testing*. The mechanical resonances of cantilevered B NWs were excited and the resonance peak frequencies were used to obtain the *Young's modulus* according to simple beam theory. A parallax method was used to obtain the correct 3-d representation of the NW based on two SEM images acquired at different tilt angles. The influences of curvature and nonideal boundary conditions on the NW resonance frequencies will be presented. Tensile loading measurements were performed to obtain the *tensile strength* and *Young's modulus*; the latter could be compared with that obtained from mechanical resonance. *This work was funded by NSF EEC-0210120, and in part by ONR # N000140210870 (partial support, W. Ding) and by the NASA BIMat URETI # NCC-1-02037 (support for X Chen).*

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