

Abstract Submitted  
for the MAR12 Meeting of  
The American Physical Society

**Thermoelectric Property Characterization of Suspended Silicon Nanowires** ANNIE WEATHERS, Department of Mechanical Engineering, The University of Texas at Austin, Austin, TX 78712, USA, FENG ZHOU, Materials Science and Engineering Program, The University of Texas at Austin, Austin, TX 78712, USA, INSUN JO, Department of Physics, The University of Texas at Austin, Austin, TX 78712, USA, MICHAEL T. PETTES, JAEHYUN KIM, LI SHI, Department of Mechanical Engineering, The University of Texas at Austin, Austin, TX 78712, USA — A key challenge in the measurement of thermal and electrical properties of suspended nanowires (NWs) is the ability to obtain clean, reliable electrical and thermal contact between the nanowire and device. We report on a technique for aligning NWs to sub-micron accuracy on a suspended device made of two SiN<sub>x</sub> membranes with the assistance of a polymethyl methacrylate (PMMA) carrier layer. Electrical and thermal contact is made by using electron beam lithography to pattern a window in the PMMA over the device electrodes, followed by oxide etching and surface passivation in wet etchant, metal deposition through a shadowmask, and lift-off. We demonstrate this technique on rough Si nanowires grown by metal-assisted chemical etching. The whole assembly is clean and without contamination. Thermoelectric properties and their correlation with crystal structure will be discussed

Annie Weathers  
Department of Mechanical Engineering,  
The University of Texas at Austin, Austin, TX 78712, USA

Date submitted: 27 Nov 2011

Electronic form version 1.4