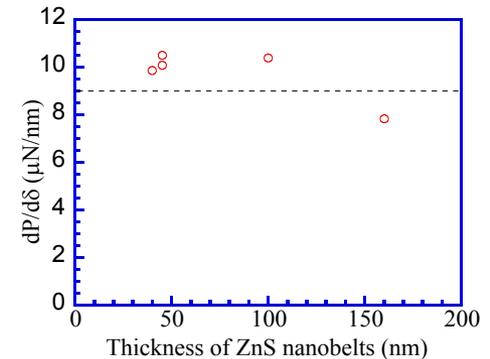
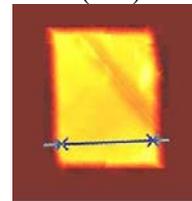
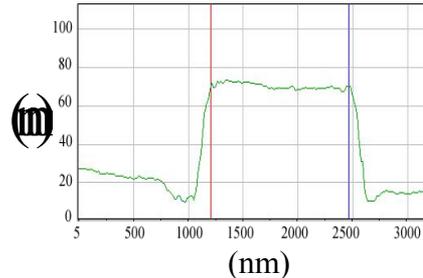
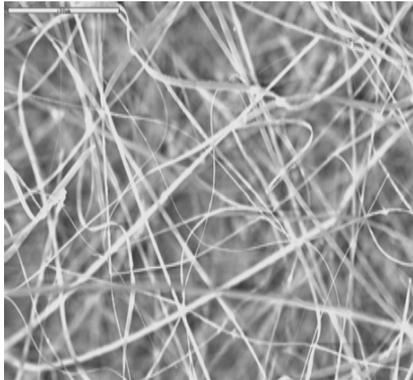


# Acquisition of Nanomechanical Instrumentation

PI: Fuqian Yang

University of Kentucky, Lexington, KY 40514, DMR-0211706



TEM image of ZnS nanobelts

A typical AFM image of a ZnS nanobelt

Thickness dependence of the contact stiffness

**Nanomechanical Characterization of Nanobelts.** Nanobelts are quasi-one dimensional nanostructures with higher ratio of width to thickness and thickness of several tens nanometers. Their nanomechanical behavior determines the applications in nanodevices and nanosystems. In this letter, the nanomechanical deformation of ZnS nanobelts was characterized by nanoindentation. It is found that the contact stiffness is a function of indentation load, suggesting the occurrence of nonlinear piezoelectric interaction during the indentation. The indentation-induced fracture in the indentation of ZnS nanobelts provides a potential approach to nanomanipulate nanobelts for the fabrication of nanodevices.

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**Education.** The instrumentation funded by this award has become the main facility in the micromechanical characterization of materials. Four graduate students have used the facility in their thesis research. The micromechanical research lab has hosted several researchers from the Department of Electrical Engineering at the University of Kentucky, the Department of Mining Engineering at the University of Kentucky, and the Department of Mechanical Engineering at SUNY Stony Brook.

The instrumentation funded by this award also has been used in undergraduate labs in MSE 401G and MSE 403G.