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Semiconducting and piezoelectric nanoarchitectures of ZnO

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ZnO is a semiconducting and piezoelectric material. The structure of ZnO can be described as a number of alternating planes composed of tetrahedrally coordinated O^{2-} and Zn^{2+} ions, stacked alternatively along the *c*-axis. The oppositely charged ions produce positively charged (0001)-Zn and negatively charged (000-1)-O polar surfaces, resulting in a normal dipole moment and spontaneous polarization along the *c*-axis. We have synthesized a series of novel nanostructures of ZnO utilizing the effect from the polar surface [1-4]e. The piezoelectric coefficient of a piezoelectric nanobelt has been found to be almost tripled compared to the value of the bulk [5], clearly indicating the exciting applications of piezoelectric ZnO nanobelts for nano-scale electromechanical coupled sensors, transducers, switches and resonators. This presentation will focus on the growth mechanisms and potential applications of piezoelectric nanobelts, nanorings and nanosprings.

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