

Abstract Submitted
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Nanotube Formation from Self-Bending Nanofilms Driven by Atomic-scale Surface Stress Imbalance¹ JI ZANG, MINGHUANG HUANG, FENG LIU, Department of Materials Science and Engineering, University of Utah, Salt Lake City, UT 84112 — We present a novel mechanism for fabricating nanotubes by self-bending of nanofilms under intrinsic surface stress imbalance due to surface reconstruction. A freestanding Si nanofilm may spontaneously bend itself into a nanotube without external stress load, and a bilayer SiGe nanofilm may bend into a nanotube with Ge as the inner layer, opposite of the normal bending configuration defined by misfit strain. Such rolled-up nanotubes can accommodate a high level of strain, even beyond the magnitude of lattice mismatch, greatly modifying the tube electronic and optoelectronic properties.

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