

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Template-Based Electroless deposition and TEM Analysis of TiO₂ Nanotubes¹ ISABEL SCHULTZ, HAIDONG LIU, ZUXIN YE, WENHAO WU, Texas A & M University — We report on the fabrication of TiO₂ nanotubes using a template-based electroless deposition method. We used anodic aluminum oxide membranes of pore diameter ~ 200 nm as the templates. The TiO₂ nanotubes were fabricated by first dipping the membranes into a titanium tetrafluoride solution at 60 °C for 30 minutes, and then annealing at 225 °C for 2 hours. The composition of the nanotubes was verified using the energy dispersive spectroscopy. We used scanning electron microscopy (SEM) and transmission electron microscopy (TEM) to study the surface morphology of the nanotubes extracted after the membranes were dissolved. The nanotubes were found to be uniform along the length of the nanotube. For TEM analysis, an ion-milling technique was also used to produce a thin sample region so that the cross-section of the nanotubes remaining in their original pore channels could be directly imaged. The thickness of the TiO₂ nanotubes is about 50 nanometers, and could be controlled by varying the deposition time. Potential applications of these semiconducting TiO₂ nanotubes for forming nanostructured semiconducting interfaces will be discussed.

¹Supported by NSF under Grant Nos. DMR-0551813 and DMR-0606529 and DOE under Grant No. DE-FG02-07ER46450

Isabel Schultz
Texas A & M University

Date submitted: 27 Nov 2007

Electronic form version 1.4