

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

New High Aspect-Ratio Titania Nanotubes EUGEN PANAITESCU, CHRISTIAAN RICHTER, LATIKA MENON, Northeastern University — Titanium oxide nanotubes show great promise in photocatalytic, gas sensing, biological, and other applications. Techniques for the fabrication of titania nanotubes include electrodeposition in polymer molds starting from alumina templates, anodization of titanium in fluoride containing solutions, and hydrothermal treatment of nano- and micropowders. We have developed a new synthesis route for the production of new ultra-high aspect-ratio (over 1000:1) titania nanotubes by anodization in chloride containing acid solutions. The fabrication process occurs rapidly, in a fraction of the time when compared with other methods such as anodization in the highly toxic fluoride-containing electrolytes. We have demonstrated nanotubes with diameters as small as 25 nm, and lengths of up to 50 μm , and we have produced them with varying carbon content through the addition of organic acids in the electrolyte. This opens up new possibilities for many advanced applications of such nanotubes. Various synthesis conditions (pH, chloride content, electrolyte nature), and their influence on morphology, composition, and crystalline structure will be presented. Preliminary results on photocatalytic and transmission properties will also be discussed.

Eugen Panaitescu
Northeastern University

Date submitted: 17 Nov 2006

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