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X-ray Studies of Ultrathin Wires and Tubes in Nanoscale Confinement JONATHAN M. LOGAN, OLEG G. SHPYRKO, ERIC D. ISAACS, Center for Nanoscale Materials, Argonne National Laboratory, Argonne, IL and JFI/Physics Department, University of Chicago, Chicago, IL, RAFAEL JARAMILLO, YEJUN FENG, JFI/Physics Department, University of Chicago, Chicago, IL, JEFFREY W. ELAM, Energy Systems Division, Argonne National Laboratory, Argonne, IL, DAVID J. COOKSON, Australian Synchrotron Research Program, Argonne, IL, MICHAEL J. PELLIN, Materials Science Division, Argonne National Laboratory, Argonne, IL — Nanoporous Anodized Aluminum Oxide (AAO) membranes are composed of self-assembled, densely packed, co-aligned cylindrical pores. The pore diameter of these membranes can be controllably reduced to as little as ≈1 nm through Atomic Layer Deposition (ALD) process. AAO pores have been used as templates for formation of metallic nanotubes and nanowires through ALD or thermal vapor deposition. These embedded structures have been characterized by small- and wide-angle x-ray scattering (SAXS, WAXS). The penetrating ability of x rays provides a non- destructive structural characterization technique for materials confined within AAO matrix, on both atomic (WAXS) and nanometer (SAXS) length scales.

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