

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Thermal conductivity measurements of Bi_2Te_3 nanowire arrays in anodic aluminum oxide template by 3ω method PING-CHUNG LEE, CHENG-LUNG CHEN, MIN-NAN OU, YANG-YUAN CHEN, Institute of Physics, Academia Sinica — Bismuth telluride is a thermoelectric material which is famous for its high figure of merit $ZT \sim 1$. Theoretical predictions propose that the thermoelectric properties of nanowires could be greatly enhanced compared to its bulk form. We have prepared Anodic Aluminum Oxide (AAO) templates with 60 nm pore diameter, 80 μm thick and $\sim 30\%$ porosity, and synthesized bismuth telluride nanowire arrays into the AAO template by electrodeposition. The modified version of the 3ω slope method [1] was employed to measure the anisotropic thermal conductivity of the nanowire array in AAO template. This report presents the temperature dependent cross-plane (parallel to nanochannel) and in-plane (perpendicular to nanochannel) thermal conductivity of the nanowires. And estimate the thermal conductivity of bismuth telluride nanowire specifically by using a nanowire filling factor of $\sim 30\%$ in a temperature range of 80-300 K. 1. D. G. Cahill, Rev. Sci. Instrum. 61, 802 (1990)

Ping-Chung Lee
Institute of Physics, Academia Sinica

Date submitted: 28 Dec 2007

Electronic form version 1.4