Thermal conductivity measurements of Bi$_2$Te$_3$ nanowire arrays in anodic aluminum oxide template by 3\(\omega\) 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 \(\mu\)m thick and \(\sim\)30% porosity, and synthesized bismuth telluride nanowire arrays into the AAO template by electrodeposition. The modified version of the 3\(\omega\) 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)