

Fabrication of NTC thermistor embedded Miniature Thermoelectric Cooling Module for Temperature Control

J. W. Park, J. C. Choi and S. C. Choi

Department of Materials Science and Engineering, Ajou University

Abstract

NTC thermistor embedded the miniature thermoelectric module was fabricated for the precise temperature control of optical communication device such as laser diode(LD). The miniature thermoelectric module(7.2mm× 9mm× 2.2mm) consists of 21 BiTe thermoelectric couples, the operating temperature is precisely controlled by embedded thermistor with quick response. The Figure-of-Merit(Z), Maximum temperature difference(ΔT_{\max}), Maximum cooling capacity(Q_{\max}) of the miniature thermoelectric module were $2.5 \times 10^{-3}/\text{K}$, 72 K, 2.2 W respectively and temperature could be controlled in range of $\pm 0.1^\circ\text{C}$ accuracy in air. The fabricated miniature thermoelectric module is suitable for applications of temperature control in the optical communication packaging.

Key Word : BiTe thermoelectrics, TEC module, embedded thermistor