

Measurement of N and P Type Peltier Element's Thermoelectric Power per Temperature Using Cryocooler

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This experiment is to measure Thermoelectric Power which is one of important properties of matter using Peltier element. We measured the thermoelectric power of commercialized semiconductor Peltier element, N type and P type based on Bi₂Te₃. First, we used a long, thin Peltier element which was cut by diamond wire as thin as possible and wound a heating wire on the sample's upside, then measured temperature differences at both sample's ends, using the thermocouple. Using Cryocooler, We changed the temperature by 5K, from 30K to 300K and measured the temperature, adjusting heater power and kept up delta T consistently. As a result, We found that Seebeck Voltage showed negative value or positive value by Dominant carrier (electron or hole) in type N and P.

Keywords: Peltier element, N-type, P-type, Thermoelectric power