# Development of Thin Film Thermal Conductivity Measurement System

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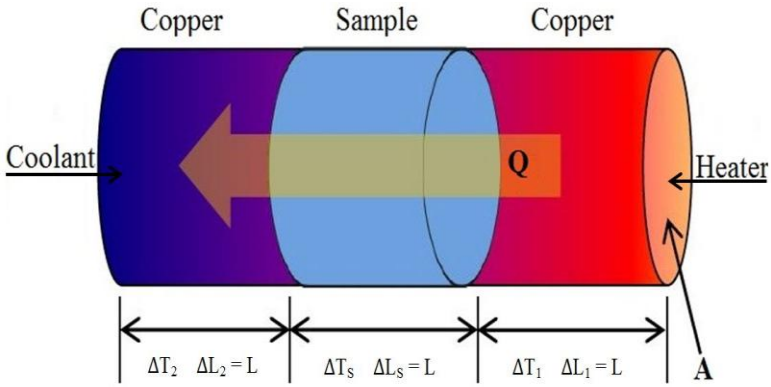
Optimal thermal managements are crucial for enhanced performance and minimal degradation in many applications. One key parameter is thermal conductivity, and its accurate measurement is important to analyze and design optimal thermal management systems. Thin film samples become popular components to the thermal management systems as the micro-/nano-technologies have been common in modern industries. However, existing thermal conductivity measurement systems are too expensive, sensitive to sample types, and challenging to accurately measure thin samples. In this study, we develop an inexpensive yet accurately measure various sample thermal conductivities including thin samples. The principle of the thermal conductivity measurement is to examine the ratio between heat flux and temperature gradient, under steady-state and 1-D temperature gradient across the sample by the sandwiched copper disks. Four thermocouples are installed to measure sample surface temperatures as well as heat flux across the sample.




Schematic of the thermal conductivity setup, including two temperature controlling copper plates with the temperature gradient and thermocouple locations.