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Abstract
We discuss a setup of automatic resistance and specific heat capacity measurement system with temperature range from 10 ~ 325 K in this thesis. With the usage of a versatile adapter secured onto the cold head of a cryodyne refrigerator, the setup is flexible for changing different sample stages to measure resistance or heat capacity of the sample easily and in a short time. Resistance measurement uses pin-contact to measure resistance without using paste material; this technique helps changing sample take only a few minutes. Measurement of specific heat capacity is performed with heat pulse method and curve fitting method. Instruments used in the study have high sensitivity, resolution; especially the temperature controller has built-in PID control function makes it easy to control temperature. The automatic measurement works with temperature stability about 0.5% of the set temperature. With this setup, we can measure resistance of samples that have value as small as about 0.1 or samples have high resistance with maximum value up to 10 M . The whole system is controlled by a personal computer to send or acquire data to or from instruments via a GPIB controller (GPIB-232CT-A) that is connected to RS232 interface. A LabVIEW software is written to run the measurements automatically. For curve fitting method, another software written in C programming language is used to analyze heat capacity at the whole curve and compute immediately heat capacity.
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