Rancang bangun sistem pengukuran impedansi listrik pada temperatur rendah berbasis Fluke PM6306 = Low temperature system for electrical impedance measurement based on Fluke PM6306

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Abstrak

Rancang bangun sistem pengukuran impedansi listrik pada temperatur rendah telah dibuat dari temperatur -110C hingga temperatur kamar. Pengukuran impedansi listrik menggunakan RCL meter fluke PM6306 yang dapat dikontrol melalui program mikrokontroler. Sistem pendingin dirancang agar mampu mendinginkan bahan uji secara non-kontak dengan menggunakan nitrogen sebagai cairan pendingin. Sistem pendingin juga dilengkapi dengan pemanas yang dapat dikendalikan secara Proporsional hingga temperatur 30C. Pengukuran impedansi listrik dilakukan dengan dua metode yaitu pada temperatur konstan dan pada saat peningkatan temperatur. Dari kedua metode pengukuran ini diperoleh impedansi listrik sebagai fungsi frekuensi, Z(f), dan temperatur, Z(T). antar-muka menggunakan LABVIEW melalui program pengendalian temperatur. hasil pengukuran berupa temperatur, impedansi dan sudut phase otomatis tersimpan dalam komputer dan ditampilkan dalam grafik T(t), Z(f), Z(T) dan plot Nyquist.
.....Low temperature system for electrical impedance measurement from -110C to room temperature has been made by using rcl meter fluke PM6306 controlled by microcontroller program. The cryostat was built to cool the sample without contact. Liquid nitrogen was used as liquid cooling. The cryostat also equipped by heater that can be controlled proportionally to heat up temperatur 30C. Impedance measurement can be carried out by two methods which are at constant temperature and during increasing temperature. From these methods, impedance as a function of frequency, Z(f), and as a function of temperature, Z(T), can be obtained. Interfacing was using labview through temperature controlling program. The results of measurement such as temperature, impedance, and its phase automatically recorded in computer and given in graphs T(t), Z(f), Z(T) and Nyquist plot.