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KEY WORD: ELECTRICAL CONDUCTIVITY / MICROWAVE MEASUREMENT / CYLINDRICAL RESONATOR

CHAKAPUN THAWORNTHIRA : MEASUREMENT OF THE ELECTRICAL CONDUCTIVITY OF MATERIALS BY A CONTACTLESS METHOD AT MICROWAVE FREQUENCIES. THESIS ADVISOR : ASSO. PROF. ANANTASIN TECHAGUMPUGH, Ph.D. 160 pp. ISBN 974-636-864-8

This research is the measurement of the electrical conductivity of materials by a contactless method at microwave frequencies. The TE_{101} cylindrical resonator which did not have current crossing between flat walls and round wall were used in this experiment. When two flat sheet samples were used as flat walls of the resonator, good electrical contacts between the samples and the round wall were not necessary there. The Q values of the resonator with brass sheets and the resonator with sample sheets were measured. From the difference of the Q values obtained, we calculated the electrical conductivity of the samples.

In the measurements we used 3 different materials: 99.9 % pure graphite, 95 % pure graphite, and glassy-graphite samples. It was found that the electrical conductivity of glassy-graphite obtained by this contactless method at room temperature was nearly equal the value by the standard DC method. But the electrical conductivity of other graphite sheets obtained were different from that obtained by the standard method. This because the glassy-graphite is amorphous material and has very smooth flat surface. This measurement can be used for other samples that can not prepare good electrical contacts in DC measurement.

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