Orissa Journal of Physics
ISSN 0974-8202

Vol. 31, No. 1
February 2024
pp. 29 -42

Review on LCR measurement of dielectrics and analysis of various parameters

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Received: 26.11.2023 ; *Accepted : 29.01.2024*

Abstract : Dielectric materials find numerous applications in electronic devices due to their insulating behavior and charge storing capacity. A material fabricated for any practical purpose need to be analyzed accordingly. Likewise the dielectric and electrical properties of the dielectric materials are analyzed using an LCR meter. This review article basically incorporates brief discussion about dielectrics, different dielectric parameters, polarization mechanisms observed inside a dielectric due to application of external electric field, different forms of dielectric materials used for LCR analysis and important information that can be obtained from the AC parameters measured by the LCR meter. Dielectric spectroscopy or complex impedance spectroscopy deals with sufficient information on the structure of matter, ion displacement, dipole orientation, charge accumulations at interfaces, conduction mechanisms, defect/vacancy distributions and resistances from grain and grain boundary regions of a dielectric material.

Keywords: Dielectrics, LCR analysis, resistive properties, electric modulus